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AGE DISCRIMINATION AND THE FAA AGE 60 RULE

HEARING

BEFORE THE

SELECT COMMITTEE ON AGING
HOUSE OF REPRESENTATIVES

NINETY-NINTH CONGRESS

FIRST SESSION

OCTOBER 17, 1985

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AGE DISCRIMINATION AND THE FAA AGE 60 RULE

THURSDAY, OCTOBER 17, 1985

House of Representatives,
Select Committee on Aging,
Washington, DC.

The committee met, pursuant to notice, at 11:00 a.m., in room 2218, Rayburn House Office Building, Hon. Edward R. Roybal (chairman of the committee) presiding.

Members present. Representatives Roybal, Volkner, Stallings, Rinaldo, Tauke, Boehlert, Bentley, Lightfoot, and Schuette.

Staff present: Fernando Torres-Gil, staff director; Roger Thomas, general counsel; Brian Lutz, professional staff; Austin Hogan, communications director; Jack Young, senior intern; Esther Urbano, staff assistant; Diana Jones, staff assistant.

OPENING STATEMENT OF CHAIRMAN EDWARD R. ROYBAL

The Chairman. The hearing will come to order.

The purpose of this hearing is to address one of the major problems facing older Americans, and that is age discrimination in employment.

We will focus our attention today on the situation of commercial airline pilots as an example of the need to eliminate vestiges of mandatory retirement.

I am going to ask the members of the committee to submit their opening statements for the record so we can give the witnesses enough time to testify and for questions to be asked.

Since there are no Members present, I do not object to that unanimous consent request.

[The prepared statements of Representatives Roybal, Pepper, and Rinaldo follows:]

Opening Statement of Chairman Edward R. Roybal

The purpose of this hearing is to address one of the major problems facing older Americans, age discrimination in employment.

We are all aware that the average life expectancy in the United States has increased dramatically in the past two decades, and that this is leading to greater numbers of older persons who can contribute to society. We must therefore utilize the experience and productivity of older workers rather than force them into mandatory retirement where they become a burden to society and their talents are lost forever.

We will focus our attention today on the situation of commercial airline pilots as an example of the need to eliminate vestiges of mandatory retirement.

Airline pilots, along with other occupations such as police and firefighters, represent persons involved in promoting public safety. We must consider public safety, but we cannot allow those words to become a catch-all phrase to eliminate all workers over a specific age if they are otherwise qualified and physically fit to continue.

A study, conducted by the National Institute on Aging (NIA) in 1980-81, found no evidence to support age 60 or any other specific age for mandatory retirement. It also suggested the medical examination being given to all pilots could be improved by the use of more modern procedures than those presently used.

Although the present medical examination system might be working, we must, in the interest of safety, look for ways to improve it. "Status-quo" is no longer good enough.

We have an impressive group of expert witnesses here today, and we have invited the FAA to explain their need to continue an age cut-off for commercial airline pilots and why they have not accepted the recommendations of the NIA for improving the medical examination for all pilots. We have invited the Air Line Pilots Association (ALPA) to explain what evidence they used to reverse their long standing opposition to mandatory retirement based solely on age. It is our hope that this hearing will continue the effort to eliminate age discrimination in our society.

Prepared Statement of Representative Claude Pepper

Mr. Chairman, I am most grateful to you for calling this hearing today. As you know, this matter—the Federal Aviation Agency's age 60 rule—is of long-standing concern to me and this committee.

In 1978, at the signing ceremony in the Rose Garden for the anti-mandatory retirement bill, I said it was a day of exhilaration for many millions of our fellow Americans who would not be assured that the dawn of their 65th birthday would not mean the death of their working lives.

Less than six months after that shining moment, this committee met to review one of the more notable exceptions to this liberalized policy—the FAA's mandatory age 60 retirement rule for pilots.

The committee found at that time that commercial pilots were routinely ejected from their pilot's seat at the age of 60 without showing any evidence of mental or physical incapacity.

Where did this arbitrary age limit come from? The Aging Committee learned that the FAA had just pulled this arbitrary age limit out of thin air—with no formal hearing process and in the absence of any just cause—in 1959. No evidence was presented establishing or even implying a connection between a pilot's age in general, or the age of 60 in particular, and his or her ability to fly an airplane.

Those Aging Committee hearings in 1979 led to the enactment of P.L. 96-171, which mandated a one-year study of the FAA's policy by the National Institutes of Health. The report of the study, released in August of 1981, indicated that there was no medical or scientific evidence to support age 60 or any other specific age for the mandatory retirement of airline pilots. However, general concerns for potential problems led the NIH to suggest maintaining the age 60 rule until the issue could be scientifically resolved. The NIH suggested that that process be initiated with the accumulation of necessary data. It also suggestd that the FAA update the physical examinations given by aviation medical examiners to airline pilots. Regrettably, the FAA has paid little notice to these suggestions.

I can certainly understand the need for competence in the cockpit. Each person here today wants to be able to feel complete confidence and trust in the man or woman at the controls of the airplane in which we're riding.

I have has several trying experiences myself while flying. I can recall one instance in which one of our engines failed, out over the ocean. At such moments, as much as I admire the younger pilots, I admit to feeling a special security if I know there are a few gray hairs in the head of the person in command. With the years come judgment, experience, adaptability and wisdom. I do not think we can arbitrarily tell a pilot that, the very minute after midnight on his or her 60th birthday, that person, no matter how distinguished a career he or she has enjoyed, is no longer fit for duty.

I know that many arguments in favor of repealing the age 60 law will be offered today. I only want to briefly mention that the airline industry is experiencing a serious shortage of qualified pilots to take the place of their experienced pilots who retire at age 60. The unprecedented growth of the industry is also calling for an increasing number of skilled pilots. To have these fine pilots retire at age 60, especially when they are in such demand, is a shameful waste of talent.

If there is any evidence supporting the continuance of what appears to be an arbitrary and capricious policy, the age 60 rule, it should be brought forward now. The

FAA has had ample time to review this matter. It is time the issue was resolved and, absent a showing of cause, it is time the airline pilots of this country were assured their 60th birthday will not mark the end of their productive careers.

Thank you.

PREPARED STATEMENT OF REPRESENTATIVE MATTHEW J. RINALDO

Today, the Committee will examine whether or not the current Federal Aviation Administration rule which requires commercial airline pilots to retire at the age of 60 continues to be justified.

At the outset, I want to stress that I am a strong opponent of age discrimination. In fact, Chairman Roybal, Congressman Pepper and I have introduced legislation to amend the Age Discrimination in Employment Act to prohibit mandatory retirement at any age for virtually all occupations.

But the question we face today is not simply whether you oppose age discrimination.

Congress has required the Federal Aviation Administration to ensure that all airline companies "perform their services with the highest possible degree of safety in the public interest." These words are quoted directly from the law, and I think we ought to keep them in mind as we listen to the testimony this morning.

For over twenty-five years, the FAA has used age 60 to help assure maximum safety in commercial air transportation—an age that is followed by virtually every major commercial airline in the world.

People say that age 60 is arbitrary. In fact, a study of the pilot retirement age done by the National Institute on Aging in 1981 found "no convincing medical evidence to support age 60 or any other specific age, for mandatory retirement"—a point those against the Age 60 Rule are quick to cite.

But the truth of the matter is that the NIA study specifically recommended that the present age limit for pilots and first officers be retained.

The report stated, and I quote: "Aircraft accidents attributed to acute or subtle incapacitation from disorders associated with aging have occurred in the United States and elsewhere. The available actuarial and epidemiological data suggest that the probability of such accidents will increase if the age limit is increased." (NIA Report, p. 2) The NIA study further concluded that no medical or performance appraisal system now exists which could serve as a safe substitute for the Age 60 Rule.

Two years later, in 1983, the FAA decided to reassess the possibility of eliminating the Age 60 Rule. Comments were solicited through rulemaking procedure. In 1984, the FAA and the Federal Air Surgeon concluded, after an exhaustive review, that there are simply no medical or performance tests which afford a sufficiently reliable basis for predicting or precluding pilot disabilities. The FAA and other medical experts are convinced that to maintain the highest standards of safety, as airlines are legally required to do, airline pilots should not be permitted to serve past age 60.

I am hopeful that, as medical and aviation science progresses, we will soon have tests of sufficient accuracy and reliability do away with the Age 60 Rule. Until the medical community speaks with one voice, however, I must agree with the FAA, the Airline Pilots Association, and the airlines themselves, that the Age 60 Rule, imperfect as it is, remains in the best interest of the nearly 300 million individuals who flew on domestic airlines in 1984. Thank you.

BACKGROUND

I. Promulgation of the age 60 rule

The Federal Aviation Act of 1958, as amended, instructs the FAA to regulate air carriers so as to ensure that airline service is performed "with the highest possible degree of safety in the public interest." 49 U.S.C. 1421(b)

In 1959, alarmed at the increase in the number of pilots age 60 and over and concerned that the number of such pilots would continue to increase at a faster rate in the future, the FAA appointed a committee of aviation and medical experts to study the question of pilot age. The committee recommended an age 60 limitation, which became effective through rulemaking on March 15, 1960. It has been repeatedly upheld on both statutory and constitutional grounds by the courts.

The FAA stated it justification in the preamble to the Age 60 Rule:

"In exploring all the ramifications of the problems involved, the nature of air traffic and air carrier operations in the future has been considered. Present indications are that the very large increases that have taken place in recent years are small in relation to the increases yet to occur. Projection of the number of pilots who will be in the 60 to 70 year age group in an era of extreme density and frequency of jet and piston air carrier operations involving many millions of passenger miles, indicates a probability of sudden incapacitation of some of these pilots in the course of flight. While medical science may at some future time develop accurate, validly selective tests which would safely allow those selected pilots fo fly in air carrier operations after age 60 safety cannot be compromised in the meantime for lack of such tests."

(The Air Transport Association reports that virtually all major countries impose pilot retirement ages of 60 or less. Federal law requires air traffic cntrollers to retire at age 56 and federal law enforcement officers and firefighters to retire at age 55.)

II. March 21, 1979 Aging Committee hearing

On March 21, 1979, the Aging Committee held its first hearing on the Age 60 Rule. The FAA testified that medical consideration justified continuance of the rule. The Air Line Pilots Association observed that it "does not trust the FAA to administer a medical examination program, in the absence of an age 60 rule, in a fair and objective way." ALPA also expressed concern that collective bargaining agreements would have to be rewritten and that pension, health and other benefits could be jeopardized if the rule were eliminated.

Chairman Pepper, a medical expert and an airline pilot retired against his will argued that the retirement rule was unjustifiable age discimination and that the rule could safely be scrapped.

III. National Institute on Aging study

After hearings by the Aging Committee and the Aviation Subcommittee of the Publc Works Committee, the Congress passed P.L. 96-171, which was signed into law on December 29, 1979. The law required the National Institute on Aging (one of the National Institutes of Health under the direction of the Secretary of Health and Human Services), to undertake a study to determine, among other things:

(1) Whether the Age 60 Rule was medically warranted

(2) Whether mandatory retirement at any specific age was medically warranted

(3) The effect of aging on the ability of individuals to perform as pilots.

Although the NIA Experienced Pilots study found "no convincing medical evidence to support age 60, or any other specific age, for mandatory retirement"—a point those against the Age 60 Rule are quick to quote—the NIA panel was also "compelled by the available data to recommend that the Age 60 Rule be retained." (p. 4) The panel: ". . . found abundant and persuasive evidence that, among pilots as well as others, disease, disability and death rates rise increasingly steeply during each half-decade beyond the age of 50. The Panel was impressed by evidence indicating that air carriers, operating under the limiting conditions of the Age 60 Rule, have achieved a very high level of safety during the past two decades. This achievement appears to be the result of a complex interplay among several factors . . . designed to minimize risks to the traveling public. The net result of this complicated interplay has been a generally effective aviation system which has promoted public safety." (p. 2)

The NIA report stated further that "Aircraft accidents attributed to acute or subtle incapacitation from disorders associated with aging have occurred in the United States and elsewhere. The available actuarial and epidemiological data suggest that the probability of such accidents will increase if the age limit is increased."

The NIA report included a chart on death and disability rates for air carrier pilots showing escalation with age. (See Appendix 1.)

The NIA Review Panel makes clear that no medical or performance appraisal system now exists which could serve as a safe substitute for the Age 60 Rule:

"Unfortunately, even more comprehensive examinations cannot yet provide quantitative assessment of intellectual functions or reliable prediction, in individuals, of the likelihood of incapacitiating cardiovascular disease. In this respect, it is important to take full account of the increasing unreliability of the screening tests in prediocting cardiovascular accidents in individuals above age 60." (p. 7)

"Although this practice would serve to sort pilots into categories of risk, it would not pinpoint those individuals who would soon experience a heart attack or stroke. Nor can available tests provide a reliable measure of the extent to which cognitive performance will be preserved as the individual ages." (p. 7)

"Moreover, the Panel could not identify the existence of a medical or performance appraisal system that can single out those pilots who would pose the greatest hazard because of early, or impending, deterioration in health or performance." (p. 1)

IV. Recent developments

As a result of the NIA study, the FAA on July 28, 1982 published an Advance Notice of Proposed Rulemaking (ANPRM No. 82-10). the ANPRM announced it was considering:

> (1) developing and implementing a program to gather data that might support a determination as to whether persons age 60 and older can safely serve as commercial airline pilots; and
>
> (2) the possibility of establishing an age limitation for flight engineers. (Note: a flight engineer, the "number 3" man in the cockpit, is not subject the age 60 rule and may work until 70.)

On November 16, 1983, the Aging Committee conducted a hearing to examine these issues. Both Chairman Roybal and Rep. Pepper voiced strong objections to extending the Age 60 Rule to flight engineers (not an issue at Thursday's hearing) and argued that testing to eliminate the rule for pilots proceed immediately.

On April 12, 1984, the FAA announced withdrawal of its 1983 ANPRM. The FAA observed that: ". . . in the absence of validly selective tests, there are not sufficient means for collecting quantitative medical and performance data on airline pilots over age 60 under conditions of actual operational stress and fatigue that do not introduce an unacceptable safety risk."

The FAA rejected the idea of a study using volunteer pilots, noting that pilots who had any fear that their performance testing or health might not be of the highest level would be less likely to volunteer, and that a satistically valid sample of the entire population was necessary to ensure useful data.

The FAA further observed that:

"The incidence of stroke and other manifestations of cerebrovascular disease is well known to rise dramatically with increasing age, as does degradation of the numerous performance factors. . . . Currently no medical or performance tests are available which afford a sufficiently reliable basis for predicting or precluding those adverse effects in any individual case. . . . Until more precise methods of detecting physiological changes brought on by aging are developed, no program of data gathering or physical examinations will provide meaningful information."

"The FAA is convinced that to maintain the highest standards of safety, as airlines are required to do, airline pilots should not be permitted to serve past age 60."

V. Additional evidence in support of FAA

Althought opponents of the Age 60 Rule argue that the great weight of medical evidence is on their side, the fact is that a substantial portion of the medical and aviation science communities believe that the age 60 rule cannot now be safely dropped. The FAA relied on numerous outside experts in reaffirming its position, including:

Don E. Flinn, M.D., professor and chairman, department of psychiatry, Texas Tech University Health Sciences Center, former consultant to the Air Force Surgeon General, former Air Force flight surgeon

"It is possible to measure a wide variety of individual perceptual, intellectual, psychomotor and psychophysiological functions. However, the relationship of these discrete functions to a complex task such as piloting a commercial aircraft has not been validated. Complex performance depends upon the interrelationship of all of these functions. No formula presently exists for combining these individual functions into a 'physiological index' of the aging. In this respect, I agree with the findings of the NIA, which conclude that the point at which measurable change in pilot performance becomes operationally significant is yet to be determined.

Charles E. Billings, M.D.,[1] *senior scientist, Man-Vehicle Systems Research Division, NASA-Ames Research Center, California and Director of the International Academy of Aviation and Space Medicine.*

"The Congress has mandated that the Federal Aviation Administrator take all steps necessary to ensure the highest level of safety in air transportation. . . . Because the likelihood of sudden death, disability and incapacitation due to previously undetected disease increases at an accelerating rate with increasing age, it is my opinion that to increase the current mandatory retirement age will compromise, by some amount, that level of safety, and that the magnitude of the risk will increase with each additional year flight crew members are allowed to remain in the cockpit."

The Air Transport Association argues, in agreement, that "the particularly sensitive occupation of an airline pilot underscores the necessity of taking every possible precaution in the furtherance of air safety. Until medical experts speak in a uniform voice on this subject, . . . retention of the Age 60 Rule is the only means of achieving the highest degree of safety in air commerce."

VI. October 17, 1985 Aging Committee hearing

In an April 26, 1985 letter (See Appendix 2), FAA Administrator Donald Engen wrote the Chairman that: ". . . there are many medical conditions, the onset of which we cannot predict to a sufficient degree to provide an appropriate assurance of safety." Therefore, what is significant is not that there may be some means of predicting or diagnosing some of these conditions, but that for many of these potentially threatening conditions there are substantial limitations associated with the accuracy or practicability of the methods available to make such predictions or diagnoses.

The conditions of which Engen concludes that the ability to predict or detect their occurrence is limited by the current state of medical science include: neoplastic diseases of various body organs, cerebrovascular conditions, Parkinson's disease, endocrine disorders and cardiovascular disease.

Despite the fact that the FAA concluded just last year a voluminous review of the medical literature and determined that the Age 60 Rule continues to be justified, this hearing has been scheduled to promote its abolition.

VII. Legislation

Roybal's H.R. 1710 would eliminate any retirement age for air traffic controllers, who currently must retire at age 56. He is is expected to introduce shortly a bill to raise the retirement age for pilots to 70. Depending on how the bill is drafted, it will be referred to either the Public Works or Education and Labor Committee or both.

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[1] Billings was a member of the Panel on the Experienced Pilots study of the NIA.

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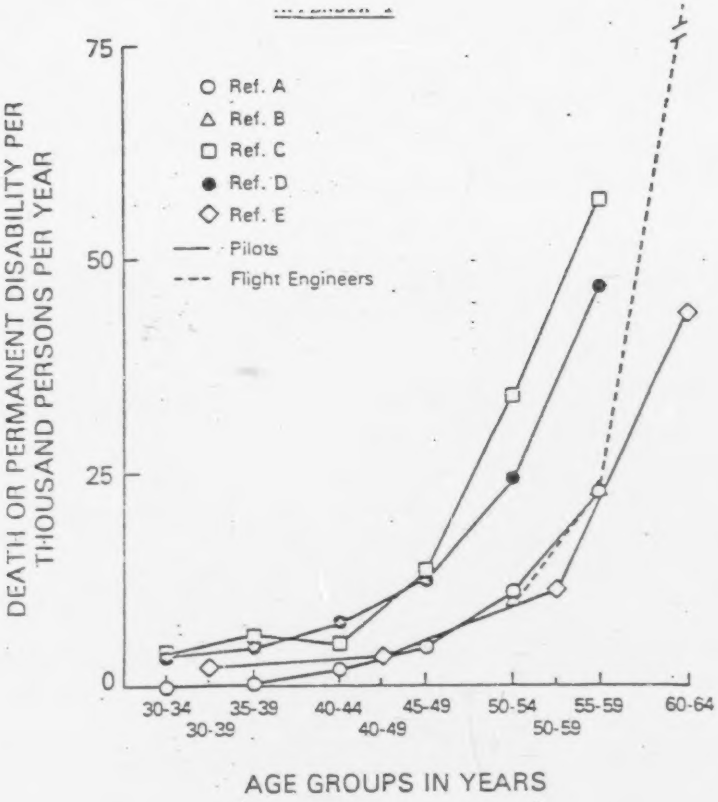

Figure 1. Death and Disability Rates in Air Carrier Pilots and Flight Engineers

A. Pilot permanent groundings for medical reasons, U. S. air carrier. Letter communication, Walter A. Jensen, Vice President, Operations and Engineering, Air Transport Association of America, June 24 and July 16, 1981.

B. Flight engineer permanent groundings for medical reasons, same carrier as (A). Letter communication, Walter A. Jensen, Vice President, Operations and Engineering, Air Transport Association of America, June 24, 1981.

C. Medical retirements and deaths, U. S. air carrier. Orford, R. R. and Carter, E. T. Aviation, Space and Environmental Medicine 47(2): 180-184, 1976.

D. Deaths and permanent disabilities in flight crew holding ALPA Loss of License insurance. Kulak, L. L., Wick, R. L. and Billings, C. E. Aerospace Medicine 42(6): 670-672, 1971.

E. Pilot groundings, U. S. air carrier. Jensen, W. A. In: Hearings before the Subcommittee on Aviation, U. S. House of Representatives, concerning H. R. 3948, July 18-19, 1979.

PREPARED STATEMENT OF REPRESENTATIVE JOHN PAUL HAMMERSCHMIDT

Mr. Chairman, as a ranking minority member of both this committee and the Aviation Subcommittee of the Committee on Public Works and Transportation, I am very concerned about this issue. Over the years, the Select Committee on Aging has held hearings examining both the public safety and age discrimination aspects of the age 60 rule. And, of course, this is not a new subject to the committee of jurisdiction, the Public Works and Transportation Committee. Because medical science and technology are constantly changing, this issue requires periodic review. In this regard, today's hearing is especially timely.

The age 60 rule for pilots is very complex and one which requires in-depth consideration. Abolishing it would allow approximately 1,000 pilots per year to continue flying. However, there are two additional facts to consider: Over 300 million people travel by air each year, and the incidence of sudden physical incapacitation increases with age. I believe that Congress has an obligation to weigh the merits of the age 60 rule because of its implications with regard to public safety vis-a-vis age discrimination.

The relationship between age discrimination and public safety is not one to be taken lightly. It's disturbing that those who favor abolishing this rule have repeatedly suggested that those holding a different opinion are suspect of age discrimination. It seems to me that when there is reason to believe that the two may be in conflict, those of us in Congress, and especially those of us on this committee, should take the time to fully evaluate all aspects of the issue.

It's true that the National Institute on Aging [NIA] study mandated by Congress did not find conclusive medical or scientific evidence supporting mandatory retirement for pilots at age 60. However, the study did recommend that the age 60 limit be retained. Most important however is the study's finding that death and disability increase with age, and its conclusion that the probability of airplane accidents could be expected to increase as a result.

I think that all of us here today would agree that the safety of every passenger in commercial aircraft should be the decisive factor in our deliberations of this issue. It's my understanding that no tests were available when the NIA study was conducted, nor have any been developed since, which can predict without question whether or not a person is mentally and physically competent. Those who wish to abolish the age 60 rule have an obligation to address the issue of public safety. As a body responsible for protecting the rights of citizens as well as ensuring the public safety, Congress ought to err on the side of public safety until such medical tests proving mental and physical fitness are available.

Mr. Chairman, I hope that today's hearing will provide us with the opportunity to re-examine the age 60 rule and to assess what impact it has on public safety. I look forward to the testimony of our distinguished witness, and thank them for their attendance here today.

The **CHAIRMAN**. We will please proceed then. I will ask the first witness to start. And that is Gen. Chuck Yeager, former test pilot, fighter pilot, and consultant.

General Yeager, will you please proceed in any manner that you may desire.

STATEMENT OF GEN. CHUCK YEAGER (U.S.A.F. RET.) FORMER FIGHTER PILOT AND TEST PILOT; CURRENTLY CONSULTANT TEST PILOT WITH U.S. AIR FORCE

General **YEAGER**. May I make a correction, sir? I am a test pilot.

The **CHAIRMAN**. All right, sir; I stand corrected.

General **YEAGER**. Thank you.

I am General Chuck Yeager. I will be 63 years of age February 13, 1986. I spent 34 years in the Air Force, 32 of that as a fighter pilot primarily, and test pilot. I retired from active duty in 1975.

The Air Force turned around and gave me a Civil Service position as a consultant test pilot for the Air Force, which I currently hold that position.

I worked for Northrup Corp. as a consultant test pilot on the F-20, which I fly frequently as an active test pilot.

During the years of my Air Force career, probably the most interesting tour of duty that I pulled was the last 2 years of my active duty. And that job was director of safety for the Air Force, not only flying safety, ground safety, nuke safety and the like. Obviously, a safety officer is vitally concerned with accidents. And studying the causes for accidents, I think in light with the subject which we are addressing today, Mr. Chairman, it seemed that the older a pilot, and the more experienced the less accidents those pilots had.

And primarily, being actively involved in flying, I think many things have occurred, both in the medical profession and in simulators and the training area of flying, that the systems are available today to very accurately evaluate pilots and to make a ruling on those pilots as to whether or not they are qualified to maintain their positions or fulfill their duties as airplane drivers.

And I am surprised that we are still plugging along with the ruling that was made some 30 years ago just arbitrarily to place a ceiling of 60 years of age on an individual to perform the duties as an airline pilot. We in the military have always operated under the policy that as long as a pilot could pass his physical and demonstrate his proficiency in the equipment that he was flying there was no age rule to how long he could keep on flying.

That is a brief resume. Jack will have my prepared statement. It was late getting here from California where I mailed it last week. And you knowing the mails, it takes about a week to get stuff like that here.

I would very much like to entertain questions now, if it is permissible, sir.

[The prepared statement of General Yeagar had not been received at the time of this hearing went to press.]

The **Chairman**. Thank you, General Yeager.

What we are going to do is ask the witnesses to testify, then we will ask questions of the witnesses.

The next witness to testify will be Dr. T. Franklin Williams. Please proceed, Dr. Williams, in any manner that you may desire.

STATEMENT OF T. FRANKLIN WILLIAMS, M.D., DIRECTOR, NATIONAL INSTITUTE ON AGING, NATIONAL INSTITUTES OF HEALTH, PUBLIC HEALTH SERVICE, DEPARTMENT OF HEALTH AND HUMAN SERVICES

Dr. **Williams**. Thank you, Mr. Chairman; Mr. Rinaldo.

I am Dr. T. Franklin Williams, Director of the National Institute on Aging. I appreciate this opportunity to present information on health and functional ability as it relates to this issue.

I have submitted a prepared statement. And I will just elaborate a little bit on it.

The **Chairman**. Without objection, both your statement and that of General Yeager will appear in the hearing record.

Dr. **Williams**. Thank you, sir.

The **Chairman**. You may proceed to summarize.

Dr. **Williams**. I think I should point out that my intention is not to speak for or against the retirement age rule, but rather to address the medical and scientific basis for the functional assessment as a basis for determining proficiency in any area, without regard to age.

Thanks to continued advances in both medical technology and research in aging, we have considerably more knowledge and understanding of health and functional ability beyond the age of 60 now than we did even a few years ago. Specifically, recent studies supported by the National Institute on Aging in healthy individuals in whom special care has been taken to exclude diagnosable diseases, show that cardiac output as measured in standard stress tolerance tests and mental functioning as measured in standard intelligence tests may be maintained at least as late as age 80, and perhaps longer, in the same ranges as in healthy young persons. Recent evidence also indicates that kidney function, as measured by creatinine clearance, does not decline with age in many healthy persons. Also, it has been demonstrated that previously sedentary generally healthy persons over the age of 60 who undertake a physical conditioning program show as much improvement in aerobic capacity and other tests as do younger people.

In other words, we are finding in persons who are spared disease conditions, functioning may be well maintained at least to age 80 and possibly longer. It is important to keep in mind that these conclusions apply to persons in whom current advanced technologies have been used to exclude conditions such as ischemic heart disease. The studies of Dr. Lakatta and colleagues in our own laboratories, and also at Johns Hopkins Hospital, have shown that about half of otherwise apparently healthy persons in their 60's and 70's, in fact do have some degree of ischemic coronary artery disease. It is in the other half of the population, who show no evidence for such conditions, that their cardiac function is as good as those in their 20's and 30's.

We are now able to conduct tests which will identify medical conditions which affect functioning and which have gone unrecognized in the past.

I refer in my prepared statement to studies using the combination of the radioactive thallium oxide screening, which is a noninvasive test, and electrocardiography, and again by Dr. Lakatta and his colleagues, with a 4-year followup on people. And in brief, as the table shows in my prepared statement, those who had evidence of abnormality on both of these measures had a 24 percent incidence of coronary events in the next 4 years. One in four had a coronary event in the next 4 years. These are people age 65 and older for the most part. Actually, I guess the age group was from about—they included people from age 50 on up. The average age was 70 in that particular group.

At the other end of the spectrum, those who had negative or normal thallium screens and electrocardiograms, only 2 percent, or one in 50, had a coronary event in the next 4 years. Now, in that group 100 of the 300 who were tested were already over the age of 70 at the time of initial testing.

These tests, these data are preliminary, and we are accumulating more. But they do indicate that we can probably quite reliably test cardiac functioning and, with reasonable reliability, identify people who have risk for coronary events.

There are similar studies done in mental testing that bear out the same types of conclusions, that mental function is very well maintained into late years in high proportion of people at whatever level of mental function they have had before, based on longitudinal studies.

These studies, as well as the findings and conclusions of the 1981 Report of the National Institute on Aging Panel on the Experienced Pilots Study, which is a matter of record, indicate that age is not a rational nor reliable criterion for determining whether or not a pilot's medical and functional condition are such that he or she should be permitted to continue in service.

In my own judgment, determination of physical and mental functioning, including identification of potential risk factors or relevant disease conditions should be the basis at any age for a division—for a decision about functional suitability. And I would emphasize any age, because there are certainly people under the age of 60 who would not qualify by refined tests for certain functional activities.

In the summary of the findings of the National Institute on Aging Panel, that panel concluded that there is no convincing evidence, medical evidence, to support age 60 or any other specific age for mandatory pilot retirement. On the other hand, disease, disability and death rates do rise increasingly beyond age 50 throughout, as we all are well aware.

The panel, at that time, therefore recommended that the present age limit for air carrier pilots-in-command and first officers be retained; and that a systematic program to collect the medical and performance data necessary to consider relaxation of the current age 60 be limited. And there was a very specific recommendation as to how this might be approached to implement collection of information that would provide the basis of a functional test to be used to determine retirement or qualifications or not for flying as opposed to an arbitrary rule.

I will conclude my comments there, sir, and be glad to take questions later.

[The prepared statement of Dr. Williams follows:]

PREPARED STATEMENT OF T. FRANKLIN WILLIAMS, M.D., DIRECTOR, NATIONAL INSTITUTE ON AGING, NATIONAL INSTITUTES OF HEALTH, PUBLIC HEALTH SERVICE, DEPARTMENT OF HEALTH AND HUMAN SERVICES

Mr. Chairman and members of the committee, I am Dr. T. Franklin Williams, Director of the National Institute on Aging (NIA). I thank you for the opportunity to present information on health and functional ability as it relates to the older pilot.

Thanks to continued advances in both medical technology and research in aging, we have considerably more knowledge and understanding of health and functional ability beyond the age of 60 now than we did even a few years ago. Specifically, recent studies supported by the National institute on Aging (NIA) in healthy individuals in whom special care has been taken to exclude diagnosable disease, show that cardiac output (as measured in standard stress tolerance tests) and mental functioning (as measured with standard intelligence tests) may be maintained at least as late as age 80 in the same ranges as in healthy young persons. Recent evidence also indicates that kidney function (as measured by creatinine clearance) does not decline with age in many healthy persons. Also, it has been demonstrated that previously sedentary generally healthy persons over the age of 60 who undertake a physical conditioning program show as much improvement in aerobic capacity and other tests as do younger persons.

In other words we are finding that, in persons who are spared disease conditions, functioning may be well maintained at least to age 80 and quite possibly longer. It is important to keep in mind that these conclusions apply to persons in whom current advanced technologies have been used to exclude conditions such as ischemic coronary artery disease. The studies of Dr. Edward Lakatta and his colleagues, in the Cardiovascular Laboratory of the NIA Gerontology Research Center in Baltimore, and at Johns Hopkins Hospital, have shown that about half of otherwise apparently healthy persons in their 60's and 70's, when tested with radioactive thallium scanning (a non-invasion procedure) in fact have some degree of ischemic coronary artery disease. It is the other half of this population, with normal scans, who have the same cardiac output on standard stress testing as do healthy persons in their 20's and 30's.

We can now conduct tests which will identify medical conditions which affect functioning and which would have gone unrecognized in the past, i.e., were not identifiable by earlier tests. Dr. Lakatta, referred to above, discusses aspects of this and related questions in a paper on “Health, Disease and Cardiovascular Aging,” which has recently been published in the book,” America's Aging: Health in an Older Society,” by the National Academy of Sciences. Further evidence of the predictive value of such testing comes from even more recent studies by Dr. Lakatta and his colleagues, in which they have found that asymptomatic middle-aged and elderly persons who exhibit both an abnormal electrocardiogram (ECG) and thallium response during exercise have a much greater risk of a coronary event than those who have only one, or no, abnormal tests. The following table summarizes their latest unpublished data:

Test results (+ =abnormal)		Number tested [1]	Number with coronary event in next 4 years	Percent	Average age—years
ECG	Thallium				
+	+	17	7	24.3	70
+	–	31	4	12.9	65
–	+	32	2	6.2	60
–	–	300	6	2.0	[2] 59

[1] These persons are a part of the Baltimore Longitudinal Study of Aging of the National Institute on Aging.

[2] Of the 300 with double-negative tests, approximately 100 are aged 70 and older.

While these data are preliminary and will require further testing, they indicate that we can probably reliably test cardiac functioning and with reasonable reliability identify risk for coronary events in older as well as younger persons.

These recent studies, as well as the findings and conclusions of the 1981 Report of the National Institute on Aging Panel on the Experienced Pilots Study, indicate that age is not a rational nor reliable criterion for determining whether or not a pilot's medical and functional condition are such that he/she should be permitted to continue in service. In its summary of findings, the Panel concluded that there is not convincing medical evidence to suport age 60, or any other specific age, for mandatory pilot retirement. Disease, disability, and death rates do, however, rise increasingly steeply during each decade beyond the age of 50. The Panel therefore recommended that the present age limit for air carrier pilots-in-command and first officers be retained; and that a systematic program to collect the medical and performance data necessary to consider relaxation of the current age 60 rule be implemented. I will be pleased to answer any questions which the committee may have.

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The CHAIRMAN. Thank you, Dr. Williams.

The next witness is Dr. Jefferson Koonce.

Mr. KOONCE. The name is pronounced Koonce, sir.

The CHAIRMAN. Koonce. Will you please proceed, Dr. Koonce, in any manner you may desire.

STATEMENT OF JEFFERSON M. KOONCE, PH.D., PROFESSOR AND PROGRAM HEAD OF HUMAN FACTORS ENGINEERING, UNIVERSITY OF MASSACHUSETTS

Mr. KOONCE. Chairman Roybal; members of the committee, my name is Jeff Koonce. I am currently a professor at the University of Massachusetts in Amherst. I am a professor of human factors engineering.

I have been involved in flying for about 27 years as a pilot, instructor, and as a researcher. I have performed research in the acquisition of flying skills, maintenance of flying skills, degradation of flying skills—generally the training of pilots—the utilization of flight simulators, requirements of simulators for successful transfer of training and of skills.

My doctoral research, performed in the Aviation Research Laboratory of the University of Illinois about 10 or 11 years ago, was in the area of flight simulators. At that time, the simulators that were used in our research were relatively antiquated compared to the machines we have today. We have made some tremendous strides in the devices that we have to train pilots, such that commercial airlines do not necessarily have to put people in the aircraft to train them to handle the systems.

They are very high fidelity systems to the extent that they have rather sophisticated motion bases, excellent visual cues, and extremely high fidelity in the controls and displays within the cockpit itself.

We have found, over time, that we can use these devices to adequately train pilots to be safe, as copilots and as captains of commercial air carriers, safe enough to fly our general paying populace. People use these machines to determine the adequacy of the pilot's ability to perform his task, however, when the pilot reaches age 60 they suddenly claim that these devices are no longer valid for determining those very same skills.

Some persons have made comments about the degree of subjectivity involved in the assessment of pilot performance. I feel that the assessment of pilot performance can vary on a continuum from relatively objective to very subjective. And the control of the degree of subjectivity rests very heavily in the hands of the management who directs the utilization of the devices in assessing pilot performance. They can allow it to be as subjective as they wish or they can demand good pilot performance measurement.

I have flown in the military, with the Air Force, for over 20 years. We assessed pilot performance, the ability to perform their task. And that was the criterion at which we allowed the persons to continue the performance of those duties. We assessed it about every 6 months.

The commercial airlines, the pilots' ability to perform their duties is supposed to be assessed reliably in a valid manner every 6 months, to the extent that we allow them to fly the paying public.

And this should still be used as a means of measuring pilot performance.

I believe that right now we are taking otherwise fully qualified, very capable, experienced persons and denying them the right to continue to perform his or her duties as pilots simply because they have reached the age of 60. And to me this seems to be blatant age discrimination. Because age is not really a true measure of the ability to perform the task of a pilot. Knowledge, skill and experience are the requirements. And those are the things that we must assess.

I generally would recommend that the industry carefully review its methods of assessing pilot proficiency, ability to perform their task, and ensure that we are doing a good job in assessing the pilots' ability, regardless of what age they are. And those who are capable of performing their tasks should be allowed to continue the performance of their duties regardless of their age.

I thank you, sir.

[The prepared statement of Mr. Koonce follows:]

PREPARED STATEMENT OF JEFFERSON M. KOONCE, PH.D., PROFESSOR AND PROGRAM HEAD OF HUMAN FACTORS ENGINEERING, UNIVERSITY OF MASSACHUSETTS

Mr. Chairman and members of the Committee, I am Jefferson M. Koonce, Ph.D., currently a professor and Program Head of Human Factors Engineering at the University of Massachusetts. I thank you for the opportunity to address your committee on matters related to the "age 60 rule" prohibiting pilots of scheduled air carriers from performing as pilots after the age of sixty years.

I have been actively involved in flying for twenty-eight years as a pilot, an instructor, and as a researcher. My B.S. and M.S. degrees are in psychology, and my doctorate is in the field of engineering psychology. My dissertation and later research has been involved with the acquisition of flying skills, the prediction of pilot performance, and the development and utilization of flight simulators for the acquisition and maintenance of flight skills. I have been a member of the United States Air Force's Simulator Advisory Group and the Department of Defense/National Aeronautics and Space Administration (DOD/NASA) Committee for Coordination of Flight Simulator Technology.

With regards to the "age 60 rule" I wish to address the topics of the changes in performance that occur as a function of age, the measurement of pilot performance, and the advantages and disadvantages of the"age 60 rule."

First, let me mention the obvious fact that airline pilots are a group of persons that are quite different from the general population of persons. When they first started their careers, the persons who were selected to be admitted into the airline pilot training systems were significantly better than the "average" person in the population in both cognitive and physical functioning. After initial selection there was further selection during the training program which made this group of persons even more select. Then, over the years of performing their duties, pilots are regularly "retrained" and given regular physicial examinations to insure that they are in the best condition. Then when questions arise regarding their performance after the age of sixty, others tend to speak of these pilots as persons representative of the general population when, in fact, they are different.

Of course, we realize the fact that pilots as a group are not immune to aging, and, that along with aging, persons vary considerably in their capabilities. We often see articles and television shorts about persons over sixty performing as well if not better than most of the population of forty year old persons, and the abundance of such information seems to be drastically increasing over the past few years. Why is this? Perhaps a person of sixty plus years today might actually be more capable in physical and cognitive functioning than sixty year old persons were when we ourselves were youngsters. Those of you on the Committee who might be beyond sixty might feel that there is some truth to this, while younger persons may respond with stereotypical feelings about older persons as being disabled physically and cognitively senile.

When talking about the population of pilots, the real concern is what are the effects of aging on pilot performance? Laboratory research has demonstrated differences in information processing and subsequent response time as a function of age that was not attributable to observable physical problems. The differences observed tend to show that the older researcher subjects take about 150 milliseconds longer to respond to complex tasks; that is, the difference is only slightly greater than one tenth of a second. These research results have been used to state that this slowing of a pilot's responses as he/she ages could be detrimental to the safety of the passengers and the general public. But in a pilot's operating environment, this difference in response time is, for all practical purposes, insignificant!

Recent research on these age-dependent changes in response to complex stimulus materials has attempted to reveal the sources of the increase in response times. Braune, Wickens, Strayer, and Stokes (1985) did find a general slowing trend with age that appears to be more pronounced with complex stimulus materials. This results of this research suggested that "the slowing was most pronounced at the stages of response selection and execution, and that this slowing was in turn heavily related to a conservative adjustment in response criterion with a corresponding shift towards more rather than less accurate performance. The data showed no loss in time-sharing ability with age." (pg. 229). The authors go on to say, "Although many of the age-related changes reported in the present research were highly reliable in a statistical sense, these results must also be put in the context of the large variability within the older age groups. This variability would suggest the danger of relying solely upon chronological age as a decision criterion. Instead, more emphasis should be placed on the notion of functional age and objective performance-based measures."

The measurement of the performance of pilots should be a part of every pilot training and operation system. This should be done to insure that those who are placed at the control of the airplanes do, in fact, possess the requisite knowledge, skills, and judgment to perform the required tasks with the greatest degree of safety. Airlines do train pilots and periodically check their skills to determine whether or not the pilots are still capable of performing their tasks in a satisfactory manner. The trusted methods used by airlines in assuring the quality of their pilots are initial line checks, enroute checks, line oriented flight training (LOFT), FAA observation of pilot performance, peer reviews, and various flight simulator scenarios. Such methods are used from the time a pilot first starts to work for an airline and are accepted by the FAA as the means of determining the adequacy of the pilots to carry the general public in the safest possible manner. However, for some strange reasons, some persons in the industry feel that either these methods are really not valid methods of determining pilot ability or they are no longer valid after a pilot reaches the age of sixty.

The quality of flight simulators in use by the airlines today are significantly better than the old "Blue Boxes" we used to fly in a hangar. The airlines have spent tremendous amounts of money on them to insure the fidelity of the displays and systems represented in the simulator cockpits, large motion systems to impart physical motion cues to the pilots, state-of-the-art visual systems to give the pilots useful out-of-the-cockpit visual cues, and special systems control panels to permit their flight instructors and check pilots to accurately simulate virtually every type of emergency that a pilot is likely to encounter. The measurement of pilot performance can be accomplished by use of the simulator's computer to measure the adequacy of control of the aircraft, the selection of proper switches, and the proper responses of procedures. Also, in administrating flight checks, there is generally a check pilot present to assertain the quality of the pilot's performance, how he or she goes about doing the tasks.

Formal evaluation of a pilot's ability to perform his/her tasks generally takes place at least twice each year. There are additional opportunities to observe a pilot's performance on each and every flight that he/she participates in. Given all of these opportunities, persons claim that the evaluation methods are too subjective to be of any practical value (after age sixty). But, the degree of subjectivity entering the evaluation process lies heavily in the hands of the airlines themselves. We like to think of them as persons with the highest degree of professionalism and we come to expect that type of behavior, from the cabin personnel to the flight check pilots. My dissertation research (Koonce, 1979) performed over ten years ago demonstrated very high inter-rater reliability coefficients on the measurement of pilots' performances, both in the control of flight parameters as well as the performance of procedural items and planning ahead. Those measures of pilot performance were taken by hand, and with today's equipment and techniques the airlines should be capable of measuring pilot performance with a very low degree of subjectivity and high degree of objectivity. The degree of objectivity-subjectivity in a performance measuring system is a function of the methods of measuring performance and the ability of those conducting the performance measurement. The devices can be enhanced for both manual and automated scoring, and those who conduct the performance measurement can be helped by good training in the measurement of performance and the positive, supportive, attitude of management. Otherwise, the assessment of pilot performance, from the new pilot to the older pilot, will be a sham to the paying public.

If a pilot should develop a problem that would have a seriously potential effect on his/her ability to adequately perform the tasks required, then how might this be determined? Simply, require them to perform the tasks. How? Use the flight simulator for those tasks of a critical or emergency nature or observe their performance in the aircraft of LOFT rides, and observe and measure their performance in doing the tasks. If the pilot can perform his/her duties to the criterion standards of performance then he/she should be permitted to continue in the role of pilot. The frequency of check rides that pilots are subjected to should be sufficient to detect and lessening of abilities before they are at a critical level regardless of the pilot's age. The performance of specific duties is the task of the pilot, not to remain below the age of sixty!

Looking at the "age 60 rule" from the industry's viewpoint there are some economic advantages to moving the higher salaried persons out of the system. Also, the use of an "age 60 rule" makes it easier for the check pilots; there is less of a demand to be careful and professional in the evaluation of a pilot's abilities. If a pilot's abilities are weakening, for whatever reasons and he/she can be carried on to reach age 60, then the pilot will be dropped and the check would not have the tough decision of telling the pilot that he/she cannot fly anymore, the "system" will do it for them. Often check pilots tend to suffer from the error of leniency, and with the preponderance of automated systems and the redundancy of more than one pilot in the cockpit such errors tend to go unnoticed. So, the "age 60 rule" can make decisions easier for some people.

But, the problem is that an otherwise full qualified, very capable, experienced person is denied the right to continue to perform his/her job as a pilot simply because he/she has reached the age of sixty. To me, this seems to be blatant age discrimination because age is not really a true requirement for the ability to perform the tasks.

I do encourage the industry to carefully review its methods of evaluating pilot performance to insure proper measurement of piloting abilities and to make that the determiner of whether or not a person, regardless of age, should continue to perform as a pilot for their airline.

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The CHAIRMAN. Thank you, Dr. Koonce.

Next witness, Dr. Sam Fox.

STATEMENT OF SAMUEL M. FOX III, M.D., PROFESSOR OF MEDICINE, AND DIRECTOR, PREVENTIVE CARDIOLOGY PROGRAM, GEORGETOWN UNIVERSITY SCHOOL OF MEDICINE

Dr. FOX. Thank you, Mr. Chairman; Mr. Rinaldo. I am Samuel M. Fox, professor of medicine at Georgetown University and Director of the Preventive Cardiology Program. Prior to this, from 1960 to 1963, I was Assistant Director of the National Heart Institute, as it then was, one of the National Institutes of Health, and was administratively in charge of both the Framingham Community Study, to which I will allude, and the early start of the Gerontology Program that preceded the existence of the National Institute on Aging. I was also Chairman of the WHO Committee on Exercise Testing, 1969, that addressed the question of the applicability of exercise testing to the characterization of risk and functional capacity from the standpoint of cardiovascular competence of individuals such as airline pilots.

My written statement is somewhat longer than perhaps is justified for reading here. It summarizes very much the same type data as Dr. Williams presented.

Dr. Lakatta, who trained with us at Georgetown, has done excellent work characterizing the ability of a series of exercise tests to characterize the ability of a human heart to perform without compromise under stresses which in large part simulate those that might occur during the tight moments of final approach or takeoff or other maneuvers in the air that would relate to commercial airline pilots.

The ability to characterize risk was also mentioned by Dr. Williams in a manner that can be undertaken at very reasonable price and is widely available throughout the United States. And I will use as an example here, which I think might be of importance to review, that from the Framingham Study we know that a 60-year-old man using no tobacco, with a systolic blood pressure of 135 millimeters of mercury, with a serum cholesterol of 210, who was found to have no glucose intolerance, that is, a tendency for the diabetic state, and no abnormalities on his electrocardiogram, will have essentially a 7.4 percent chance of developing evidence of coronary artery disease in a period of 6 years. This is solid data from the followup of these individuals in Framingham, where the study has been ongoing for over 30 years.

This is in contrast with the average 60-year-old Framingham male who would have an 11.1 percent probability of developing some manifestation of coronary disease.

By these simple tests then, available in most physicians' offices, we can characterize this man's risk because he is a clean-living, noncigarette-using person with normal values as only three-quarters or less of the average of men his age.

If because of his interest in qualifying as a commercial airline pilot or for other activities he is given a symptom limited exercise tolerance test, and this shows no evidence of coronary insufficiency or other impairment, at a level which is equal to or above that which is usual for the age, and the average is around what we call 10 to 11 multiples of resting metabolic rate, and if he achieves this without irregularities of the heart or other evidence of inadequacy, we could drop his probability score from 7.4 to 2 percent with a 6-year projection.

If during that high level exercise test, we injected the thallium isotope that Dr. Williams mentioned and found that on the pictures taken of the distribution of that isotope there were no defects, so-called, "cold spot subtraction defect" indicating a lack of smooth and even distribution or, as we say, perfusion of the isotope through the heart muscle, then we can drop the probability score to 1 percent. And there is firm data in the literature that supports these data.

The average 45-year-old man, without any assessment, which unfortunately is altogether too frequent in society today, and is quite frequent in commercial airline pilots, has a 4.5-percent probability, as compared to a defined 1-percent probability that would result from these perhaps elaborate seeming procedures, but those which are widely available and can be obtained for $700 or less in most laboratories.

Therefore, it is my contention that it is quite possible, and from a systems standpoint justified, to have those individuals who have responsibility for commercial airline pilot work, and other safety-related responsibilities, to have a system whereby they can get these evaluations. Maybe they will have to support the expense. But compared to the salaries these men are able to draw, $700 is both reassuring and I think quite reasonable for maintaining their abilities.

In closing, therefore, I can summarize by saying I believe our citizens can rest easy and with confidence and trust their family members to fly with a well-evaluated, medically cleared 65-year-old pilot, or perhaps even older, knowing that he is at less than half the risk of an acute disabling coronary attack than the average 45-year-old unevaluated pilot that we are likely to have in our airline system today because of the regulations not requiring such evaluation. And therefore, I think there is real opportunity to help protect the citizens by tightening up on the evaluation procedures, but also granting those who can qualify and demonstrate their capability for unimpaired performance to continue to perform those duties.

Thank you very much.

[The prepared statement of Dr. Fox follows.]

PREPARED STATEMENT OF SAMUEL M. FOX III, M.D., PROFESSOR OF MEDICINE, DIRECTOR, PREVENTIVE CARDIOLOGY PROGRAM, GEORGETOWN UNIVERSITY SCHOOL OF MEDICINE, WASHINGTON, DC.

It is well established that a male in his late fifties can be evaluated by widely available medical tests and given a characterization of his risk of developing evidence of coronary heart disease an/or stroke over a period of at least 5 years. By using the data from the Framingham Community Study, a man's serum cholesterol, blood pressure, smoking history and electrocardiographic interpretation can be combined with evidence of glucose intolerance (diabetic tendency) to produce "probability statement" of risk of developing manifestations of coronary heart disease in a span of 6 years.

A symptom-limited Exercise Tolerance Test will increase the power of characterizing the risk of occurrence of coronary disease.

Nuclear cardiology techniques (Technicium and Thallium exercise studies) can add further strength to the certification that a man either has, or does not have, an elevated risk of acute coronary collapse. Although one can not absolutely guarantee that a man will not have a disabling episode, a "probability statement" can be developed that will reduce the chance to less than 1% if an appropriate application of the above tests demonstrate no abnormality.

A typical test sequence is presented:

A 60 year old man using no tobacco with a systolic blood pressure of 135 and a serum cholesterol of 210 is found to have no glucose intolerance (diabetic tendency) and normal electrocardiogram. From the Framingham Community study his risk of developing coronary disease manifestations in 6 years is 7.4% as contrasted with the average 60 year old Framingham males who would be rated at 11.1%.

A symptom-limited Exercise Tolerance Test shows no evidence suggestive of coronary insufficiency at 12 METs of superior aerobic capacity justifying a reduction in the coronary disease probability score to 2% for a six year projection.

The Thallium scans taken after the injection of Thallium 201 isotope at peak exercise reveal no evidence of a "cold spot subtraction defect" in the scintigraphic pictures that would characterize uneven or deficient perfusion of the heart muscle or suggest a compromised blood supply. This warrants a further reduction of his "probability score" to less than 1% likelihood of having any manifestation of coronary disease in six years. The chance of having a sudden, incapacitating event while flying is far less than 1%.

The average 45 year old male in the United States, not evaluated by the above procedures, has been found to have a 4½% "probability".

For less that $700, and widely available in the United States, we have the means of "clearing" pilots for flight responsibilites at a level that should satisfy even the most sceptical inquirer. These tests not only evaluate risk "at rest", but evaluate cardiovascular performance under severe stress.

In closing, I can summarize by saying I believe our citizens can "rest easy" and with confidence entrust their family members to fly with a well evalauted and medically cleared 65 year old pilot knowing that he is at less than half the risk of an acute disabling coronary attack than the average 45 year old, unevaluated pilot (by todays regulations) who is likely to be a commercial pilot.

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The CHAIRMAN. Thank you, Dr. Fox.

Captain Shaver, will you please proceed in any manner you may desire.

STATEMENT OF LEROY ALVIN SHAVER, PH.D., SECOND OFFICER, UNITED AIRLINES; APPEARING ON BEHALF OF THE AMERICAN ASSOCIATION OF RETIRED PERSONS

Mr. SHAVER. Mr. Chairman and members of the committee, I am second officer or Flight Engineer Leroy Alvin Shaver with United Airlines. I want to thank you for this opportunity to speak on behalf of the American Association of Retired Persons and, indeed, on behalf of all commercial airline pilots who want to continue flying past the current forced retirement age of 60.

I apologize for being late, Mr. Chairman. The AARP is a little bit bureaucratic. You gentlemen are used to bureaucracy. And by the time all of the different people there this morning approved what I am going to say I was late in leaving. But when one is going to speak for 20 million members of AARP, I suppose a little care in looking things over is justified. This is the largest membership organization in the United States. Also, I am proud to be one of the highly trained persons who for over 40 years has been responsible for the safety of airline passengers and crews on the airplanes I have flown to various parts of the world.

I joined United in January 1944, when I was 22 years old. And when I pulled up to the gate at Honolulu Airport 38 years later in a 747 and set the parking brake, I want to tell you that was an emotional experience. I enjoyed the trip. The passengers all signed little notes and sent up to me; they knew it was my last trip as captain. When I set that parking brake I asked myself what in the world is going to be different about me on the 27th of this month than right now on the 20th? Why can I do this now? Why am I qualified, but on the 27th, when that 60th birthday comes around, I am not going to be allowed to fly any commercial airliner, much less a 747?

Flying, as most of you know, is a lot more than just a job or earning a living. For me and my colleagues that is the way it is. It is really a way of life. It demands a level of commitment and competence. It provides a degree of exhilaration that is just not found in very many occupations. There is a really special joy and a personal satisfaction in being in command of a huge complex machine like that. For example, flying eastbound over the Pacific in the middle of the night headed for Chicago seeing a huge Moon come up, or flying westbound into the sunset, each layer of clouds a different color because the sun is setting. Things like this you never forget. And believe you me, you miss them when you have experienced them.

I decided to fly or to become a pilot when I was 6 years old. And I never changed my mind. I took my first flying lessons when I was 14. And my 16th birthday present was a physical examination from a Bureau of Air Commerce doctor—that was what they called the FAA in those days. And it was a happy birthday indeed, because that meant I could now go out and fly solo legally. My life has been involved with flying continually since that time, except for 15 months that I was grounded because of the age 60 rule.

I started out as an RAF flight instructor. They could not teach these people to fly in Britain, the Luftwaffe would have shot them down. So they sent them here, to Canada and Australia to learn to fly. So I taught RAF cadets. And then I became an experimental test pilot for Bell Aircraft doing prototype tests on the P-63 and tumble tests on a P-39. Some of these airplanes were ancestors of the airplanes that Chuck Yeager flew.

Flying really was not the only thing I could have done because I have achieved the distinction of a Ph.D. from the University of Chicago in gerontology. I am a successful account executive with a stock brokerage firm. I currently have two full-time jobs. But really, nothing else has ever come close to the satisfaction I derive from being captain of an airplane, particularly a 747.

When I was forceably retired in 1981, with no consideration for the experience and knowledge, the ability I developed as a pilot, no recognition of my commitment to this profession—I had never been late for work in 41 years—no recognition of my commitment to this profession and disregard of my high level of physical and emotional fitness, the door really slammed on the largest and perhaps most important part of my life, outside of my family, of course, with no reason. I have seen this happen to dozens of my colleagues who were skilled and valuable pilots one day and unemployed the next. I am talking about people who were at their prime as pilots and vital human beings. They now have nowhere to contribute that experience and energy.

In conducting the research for my Ph.D. dissertation at the University of Chicago, I examined the attitudes of United pilots and other employees to forthcoming retirement. The research that I did and my subsequent observations have led me to some conclusions. One of them is I have found that most pilots simply cannot understand why they are shelved when they are clearly as vigorous and just as capable as they were the day before they turned 60. I am not talking about the obvious loss of salary and status. I am talking about being told at the now young age of 60 that you are just too darn old to do a job you could continue to do very well.

This mandatory retirement rule just cannot be justified on blanket medical grounds or on the airlines' and the FAA's inability to assess any individual pilot's physical and psychological fitness. Indeed, the health information the FAA and the airlines have on all their pilots far exceeds what most doctors have for their patients.

Can you imagine the FAA's file on me? They have been giving me physical exams since October 1937. United Airlines' medical department has annual records of my physical condition since October 1943 when I applied for the job. With all of that historical material and with the technology they have today, I certainly feel that they have all that they need to assess each of us individually.

A couple of months ago, August 30, 1985, I took a first-class physical examination—I have the little slip of paper in my pocket. A first-class physical is what one needs to fly as captain—and I would certainly like to fly in that capacity.

I really wonder why the FAA at this point is not willing to treat people like myself, other pilots over 60, in the same manner that they treat younger pilots who have physical disabilities. On United Airlines and on others we have captains flying who have had heart attacks, who have had coronary bypass surgery. I am flying with one this month who has total loss of hearing in one ear, a hearing aid in the other. He gets along just fine.

I am not critical of any of this. The FAA follows these people very closely. It monitors their condition. I have not heard of any problem involved with this program. All that I ask is that the FAA give the same consideration to those of us whose only real impairment is that we have had that darn 60th birthday.

I do find some satisfaction in flying in that third seat. I used to have four stripes on this same uniform, and because I am 60, one of them has been removed. Being in that third seat, being part of the crew is a satisfying experience at some level, but believe you me, it is nothing like being the pilot in command of that 747.

A lot of pilots, a lot of my colleagues, just do not feel that they can quite handle moving from the first seat to the third seat, so they elect to go ahead and retire. But believe you me, if they have the opportunity to take the required physicals, whatever is required, whatever examinations the FAA might wish to impose, they would love to stay on and fly.

Gentlemen, the FAA just has not done a thing about this. So I am here today, as I said, representing the 20 million members of AARP who are behind us and ask that you, Congress, do something about this, get things going, give us a chance to use our talents, use our experience.

Thank you very much.

[The prepared statement of Mr. Shaver follows, along with the proposed statement of the American Association of Retired Persons:]

PREPARED STATEMENT OF SECOND OFFICER LEROY ALVIN SHAVER, PH.D., ON BEHALF OF THE AMERICAN ASSOCIATION OF RETIRED PERSONS

Mr. Chairman and Members of the Committee:

I am Second Officer—or flight engineer—Leroy Alvin Shaver with United Airlines. I want to thank you for this opportunity to speak on behalf of the American Association of Retired Persons and, indeed, on behalf of all commercial airline pilots who wish to continue flying past the current forced retirement age of 60. I am proud to be a member of AARP which, with over 20 million Americans over the age of 50, is the largest membership organization in the country. I am also proud to be one of the highly trained persons who for over 40 years has been responsible for the safety of airline passengers and crews on the planes I have flown around the world.

I joined United Airlines in January 1944, at the age of 22. When I pulled up to the gate at Honolulu International Airport 38 years later, in October 1981 and set the parking brake on the 747 for the last time, I wondered why on the 27th of that month I would be considered no longer capable of flying that or any other commercial plane.

Flying is not merely a job or just a means of earning a living for me and for very many of my colleagues. It is a way of life that demands a level of commitment and competence, and provides a degree of exhilaration, not found in many endeavors. There is a special joy and personal satisfaction in successfully commanding a complex and highly sophisticated machine while flying under a huge new moon over the Pacific or through multi-colored layers of clouds. I decided to become a pilot when I was six years old. I took my first flying lessons when I was 14 and my 16th birthday present was an FAA physical exam so that I could legally fly solo. My life has been involved with flying continually since that time—as an RAF flight instructor, an experimental test pilot for Bell Aircraft and commercial airline pilot. Flying was not the only profession I could have qualified for—I have achieved the distinction of a Ph.D. from the University of Chicago in Gerontology and am a successful account executive for a stock brokerage firm. But nothing has ever come close to the satisfaction I derive from being a pilot. When I was forcibly retired in 1981, with no consideration for the experience, knowledge and ability I had developed as a pilot, no recognition of my commitment to this profession and disregard of my high level of physical and emotional fitness, the door slammed on the largest and perhaps most important part of my life outside of my family—with no reason. I have seen the same thing happen to dozens of my colleagues who were skilled and valuable pilots one day, and unemployed the next. I am talking about people who were at their prime as pilots and vital human beings, but now have nowhere to contribute that experience and energy. In conducting the research for my Ph.D. dissertation, which examined the attitudes of United pilots and other employees to retirement, and my subsequent observations of the experience of these people once retired, I have discovered that most pilots are unable to understand being shelved while still clearly as vigorous and competent as ever, and are unable to find any real substitute for being an airline Captain. I am not talking only about the obvious losses of salary and status; I am talking about being told at the young age of 60 that you are too old to do a job you continue to do well.

This mandatory retirement rule cannot be justified on blanket medical grounds or on the airlines' and the FAA's inability to assess any individual pilot's physical and psychological fitness. Indeed, the health information the FAA and the airlines have on all their pilots far exceeds what most doctors have for their patients. For example, the FAA's medical file on me dates back to 1937 and United's to 1943. I am still required to undergo a complete FAA physical exam annually as a flight engineer and in August 1985 I passed my First Class physical, which is the physical necessary to fly as Captain. It is difficult for me to understand, given these facts and the absence of any incapacitating health factors in my 40 years with United, why the FAA is willing to assess pilots under 60 on an individual basis and grant them waivers to fly notwithstanding a medical history that may include heart attacks, coronary bypass operations, previous alcoholism, hearing loss, etc., but is unwilling to provide the same consideration for me and many others with excellent medical records who just happen to be above the somehow magic age of 60.

I have been luckier than most. I had the ability and support necessary to rechannel my energies into other, admittedly less satisfying, areas when forced to retire. Nonetheless, when finally offered the opportunity to again become part of the flight crew by becoming a flight engineer, I jumped at the chance. In no way does this substitute for being Pilot-in-Command, although I have been able to find some smaller measure of satisfaction in simply being in the cockpit. For this good reason, many retired pilots are unwilling to take this frustrating step down.

If there is a justification for mandatory retirement of pilots at age 60, I would like to know what it is. I don't believe there is any. In my years of working with FAA personnel, I have come to develop great respect for their ability and commitment to air safety. I am confident they are able to assess the fitness of all pilots, regardless of their age and screen out those individuals who should not be flying. Unfortunately, the FAA has been unwilling to do this. It is my hope that Congress will take steps to correct this great injustice. A tremendous amount of talent is going to waste

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PREPARED STATEMENT OF THE AMERICAN ASSOCIATION OF RETIRED PERSONS

The American Association of Retired Persons (AARP) welcomes the opportunity to present its views on the age 60 mandatory retirement age for commercial airline pilots. This written statement will supplement the testimony presented by Second Officer LeRoy Alvin Shaver on behalf of AARP (attached hereto).

AARP, with a membership of more than twenty million persons over the age of 50, is the largest organized group of older Americans in the country. AARP is committed to promoting and strengthening the Age Discrimination in Employment Act (ADEA) to ensure that older workers are not subject to forced retirement or other forms of age discrimination. Since the passage of the ADEA in 1967, AARP has worked with Congress, state legislatures, the courts and the Executive branch to expand the scope of the statute. AARP strongly supports application of the ADEA's protections to government and other federally-regulated employees and elimination of all mandatory retirement ages.

AARP has recently launched a major campaign aimed at improving employment opportunities available to older workers, the "Worker Equity Initiative." AARP has also increased its advocacy efforts in the federal courts. In 1984, AARP submitted amicus curiae briefs in two recent Supreme Court cases interpreting employee rights under the ADEA, *Johnson* v. *Baltimore* 105 S.Ct. 2717 (1985) (which rejected a mandatory retirement age of for municipal firefighters) and *Western Air Lines* v. *Criswell* 105 S.Ct. 2743 (1985) (which rejected a mandatory retirement age of 60 for airline flight engineers.) AARP will vigorously continue its efforts to change America's attitudes and employment practices regarding older workers.

I. THE FAA AGE 60 RULE, THE ADEA AND BONA FIDE OCCUPATIONAL QUALIFICATIONS

The FAA's Age 60 Rule prohibits persons over age 60 from serving as pilots on air carrier operations. This rule, promulgated in 1959, is intended to protect against the risk of a pilot's sudden incapacitation in flight from heart attack or stroke. The FAA's justification for the rule was—and remains—that medical testing cannot accurately predict physical changes in older pilots and that older pilots as a group are more likely to suffer an incapacitating event. Challenges to the rule and to the FAA's refusal to grant any exemptions whatsoever have been unsuccessful. Although the FAA has the authority to grant exemptions from the Age 60 Rule, 49 U.S.C. sec. 1421(c), no exemptions have ever been granted. Indeed, the FAA has never even bothered to institute a procedure for considering requests for exemptions. No pilot over age 60, regardless of his or her individual health characteristics, has been permitted to remain a pilot. In stark contrast to this policy, however, the FAA permits its own pilots to fly for as long as they are qualified.

Criticisms of the rule have focused on its apparent violation of the ADEA. The ADEA, like Title VII, prohibits employment practices that discriminate on the basis of stereotypes about the characteristics of a certain group of workers. Thus, employers may not rely upon generalized perceptions about the performance of older workers when making hiring, promotion and other workforce decisions; instead, the aptitude and fitness of each employee, regardless of age, must be assessed using comparable criteria.

Exceptions to this requirement of individual assessment have been permitted in rare circumstances and only when justified as a "bona fide occupational qualification." The employer has a heavy burden of proof to show that an blanket age-based employment practice is justified. The employer must show:

(i) the job qualifications invoked to justify discrimination are reasonably necessary to the essence of the employer's business; and

(ii) either all or substantially all persons excluded by the age limitation cannot perform up to the required standards, or *it is impossible or impractical to deal with all members of the excluded class on an individualized basis.* See *Western Air Lines, Inc.* v *Criswell.* 105 S.Ct. 2743, 2752 (1985) (emphasis added).

In *Western Air Lines* v. *Criswell*, 105 U.S. 2743 (1985), the Supreme Court held that "the process of psychological and physiological degeneration caused by aging varies with each individual, and therefore such determinations should not be group-based." The Court rejected the airline's attempt to extend the Age 60 Rule to flight engineers, holding that it could not prove that the age qualification is "reasonably necessary" and related to the conduct of the employer's business—in this case an overriding interest in public safety—and that the employer is compelled to rely upon age as a proxy for the safety-related job qualification. *Western Air Lines* at 2751.

Although the Age 60 Rule for pilots has been held to be a reasonable exercise of the FAA's administrative authority, the question of whether the FAA has satisfied the requirements for an BFOQ exception to the ADEA has never been addressed by any court. The Equal Employment Opportunity Commission (EEOC), however, expressly rejected the Age 60 Rule as a justifiable BFOQ when it assumed regulatory authority over the ADEA in 1981. In light of the *Western Air Lines* case, and for reasons discussed more fully below, it is doubtful whether the FAA could first introduce the Age 60 Rule today. The Age 60 Rule could qualify as a BFOQ were the FAA to introduce it today.

II. NO EVIDENCE SUPPORTS THE AGE 60 RULE AS A BFOQ

No legal challenge to the Age 60 Rule has ever addressed whether the evidence in the record and the FAA's rationale for the rule satisfy the requirements of the ADEA. See *O'Donnell* v. *Shaffer,* 491 F.2d 59 (D.C. Cir, 1974); *Air Lines Pilots Ass'n Int'l* v. *Quesada,* 276 F.2d 892 (2d Cir. 1960). Recent advances, in medical knowledge and technology have undercut the FAA's historical rationale for the rule. In 1979, Congress mandated a review of the medical data underlying the Age 60 Rule (P.L. 96-171). The subsequent report of the National Institute of Aging (1981) found no medical evidence to support the forced retirement of all older pilots. The report recommended retention of the rule only until procedures that would treat all pilots individually could be promulgated. In other words, since the Age 60 Rule could not be supported as a BFOQ, it should be eliminated as quickly as administratively feasible.

As with flight engineers in *Western Air Lines,* neither the FAA nor employing airlines can cite to any medical or other evidence justifying mandatory and arbitrary retirement of all pilots at age 60. In June 1982 the FAA issued an advanced notice of proposed rulemaking (ANPRM) requesting comments on the feasibility of gathering data to determine whether persons age 60 or older could safely serve as airplane pilots. The ANPRM was withdrawn in April 1984, without the FAA taking any action to implement or otherwise respond to the lack of evidence in the record or the NIA's suggested approach to changing the Rule. Disregarding the evidence in this manner is in itself an abuse of administrative discretion.

To further undercut the basis for the rule, the FAA itself has admitted that even its use of the particular age 60 is arbitrary and justified only by the argument that at some point during the aging process, the very greatly increased risk of sudden incapacitation warrants discrimination against all pilots. However, no evidence as to at what if any age this high degree of risk occurs has ever been presented. Indeed, the FAA adequately deals with the fact that some degree of this risk is always present for pilots of all ages, which is why there are almost always three persons in the cockpit qualified to fly the plane.

The FAA's current position is that it cannot relax the rule without sufficient data on the actual performance of pilots aged 60 and older; it also believes that it cannot allow any such pilots to continue flying—and thus generate the needed data—without introducing an unacceptable safefy risk. (See 49 Fed. Reg. 14692 (1984)). This FAA policy, however, stands in direct contradiction to the requirements of the ADEA. It is not the pilots' burden to prove that they, as a group, are healthy enough to fly; it is the burden of the FAA and the airlines to show that, first, the medical evidence justifies mandatory retirement of all pilots at age 60 and second, it unnecessary and impractical to assess the fitness of each pilot over age 60 on an individual basis. The FAA and the airlines cannot, in light of the evidence, assert that individualized testing is impossible.

AARP recognizes that, as a federal agency's conclusion of fact, the FAA's rule may not be subject to the same stringent standard of proof as a private employer's BFOQ. Nonetheless, the absence of any evidence of the type required by the Supreme Court in Western Air Lines argues strongly that the FAA has abused its discretion in maintaining the Age 60 Rule.

III. AN EQUITABLE AND PRACTICAL ALTERNATIVE TO THE AGE 60 RULE

The legitimate safety concerns of the FAA and airlines, and the rights of older pilots to be free of age-based discrimination in employment, need not be at odds with each other. There exists a better and easily implemented procedure by which to satisfy all these concerns than the discriminatory Age 60 Rule: assess the fitness of every pilot, including those over age of 60, on an individual basis. The mechanism for achieving this is already in place—the health of every single pilot, flight engineer and other employee, regardless of age, responsible for flight safety is already presently assessed on an individual basis.

AARP urges Congress to make clear to the FAA and all employers its intention that age discrimination in employment, regardless of whether it is practiced by a private employer or a regulatory agency, be justified only in those circumstances where the evidence proves it is "reasonably necessary" to the conduct of the employer's business and is the only mechanism by which such legitimate business interests can be served. Age-based limitation, such as the Age 60 Rule, are inexcusable in light of present medical technology.

The CHAIRMAN. Thank you, Mr. Shaver.

Captain, you made reference to the FAA. I would like to ask Mr. Broderick, who represents the FAA, to testify at this point.

Mr. Broderick, will you please take your seat next to General Yeager and give us your testimony. Then the committee will ask questions of all the witnesses.

Will you please proceed, Mr. Broderick, in any manner you may desire.

STATEMENT OF ANTHONY J. BRODERICK, ASSOCIATE ADMINISTRATOR FOR AVIATION STANDARDS, FEDERAL AVIATION ADMINISTRATION, ACCOMPANIED BY FRANK AUSTIN, M.D., FEDERAL AIR SURGEON, FEDERAL AVIATION ADMINISTRATION; AND JON JORDAN, M.D., DEPUTY FEDERAL AIR SURGEON, FEDERAL AVIATION ADMINISTRATION

Mr. BRODERICK. Mr. Chairman, thank you.

Accompanying me today are Frank Austin, FAA's Federal Air Surgeon, and Jon Jordan, Deputy. We are pleased to appear before you to discuss what is commonly referred to as the age 60 rule. I welcome the opportunity to set out for you our retionale behind the rule, and to discuss with you why it continues to be a needed safety rule.

Briefly, the age 60 rule, contained in part 121 of the Federal Aviation Regulations, provides that an individual who has reached his 60th birthday may not serve as a pilot of an aircraft engaged in air carrier operations under part 121 of the Federal Aviation Regulations. The rule does not prohibit pilots from serving in other capacities with the airlines, though, such as flight instructors, check airmen, or flight engineers. In fact, in 1984, we concluded that the age 60 rule should not be expanded to cover flight engineers, following the issuance of a notice of proposed rulemaking that we published for comment in response to a petition for rulemaking from United Airlines.

The age 60 rule was adopted on December 1, 1959, and made effective on March 15, 1960. It is an aviation safety rule promulgated in accordance with the Federal Aviation Administration's statutory mandate to promote aviation safety, and in recognition of the statutory duty of air carriers to provide the highest level of safety.

The rule was controversial among some groups then, and it remains so to this day. Because of the very nature of the rule, it has been subjected to frequent scrutiny throughout its history. As far back as 1960, the basic rule itself was challenged in litigation. It has been the subject of numberous suits since that time, many of which have focused on the agency's policy of not granting exemptions. In each instance the agency has been upheld. The Congress itself carefully examined the basis for the rule in 1979 and, because of its concern that safety could be compromised by amending the rule, left the rule unchanged, calling instead for a study to be conducted by the NIA to determine whether there was a continued need for the rule.

The National Institute on Aging, pursuant to its extensive analysis, found no feasible safety alternatives to the rule. The Panel, which conducted the review, while indicating that it did not attach a medical significance to age 60 as a mandatory retirement age for pilots, nevertheless found that age-related changes in health and performance influence adverse—and performance influence adversely the ability of increasing numbers of individuals to perform as pilots with the highest level of safety and, consequently, endanger the safety of the aviation system as a whole. Moreover, the Panel could not identify the existence of a medical or performance appraisal system that can single out those pilots who would pose the greatest hazard because of early, or impending, deterioration in health or performance.

In the 2½ decades that the age 60 rule has been in effect, the FAA, as confirmed by the analysis done by the National Institute on Aging, has not yet been able to find an alternative approach to the rule that we are confident will protect the American traveling public. It is important to recognize in this regard that the safety reasons for the rule are several fold: First, there is a deterioration of many functions with age; Second, ageing is accompanied by an increased frequency of sudden or insidious incapacitation or death from various disease processes; And, third, despite scientific advances that have occurred, there is still no way to predict, with reliable accuracy, the presence or onset of a number of medical problems in an individual aging pilot or to detect and measure all of the possible declining physical and mental functions. In this respect, there are a number of factors that are not yet susceptible to precise measurement as to their effect, but which require consideration in connection with safety in flight, that result simply from aging alone and are, with some variations, applicable to all individuals. These relate to the loss of ability to provide highly skilled—to perform highly skilled tasks rapidly; to resist fatigue; to maintain physical stamina; to perform effectively in a complex and stressful environment; and to rapidly apply experience, judgment, and reasoning in new, changing, and emergency situations.

Those were the kinds of concerns which led to the rule, and they remain concerns today, despite advances in science and despite the frequency or types of medical examination which may be conducted. Clearly, there has been no change in the age-related nature of these declining skills since the rule was promulgated.

Given these factors, the effects of the aging process on pilots could not be ignored from a safety perspective. Therefore, the age 60 rule was established as a reasonable response to these threats to safety. I would note that, while we do not have direct information on the performance of pilots in part 121 air carrier operations past the age of 60, an analysis of general aviation accident data does seem to bear out the safety rationale of the age 60 rule. That analysis, contained in an FAA report entitled "The Influence of Recent

Flight Time, Total Flight Time and Age on Pilot Accident Rates," written in June 1983, demonstrates that pilot accident rates increase with older pilots.

Significantly, this was generally the case, even for pilots with high total or recent experience which would most closely approximate the character of airline pilots. While I would hesitate to draw any direct correlations between this assessment of pilots generally and pilots covered by the Age 60 Rule, the data, while not conclusive, does clearly argue for caution in dealing with the Age 60 Rule.

While we continue to monitor scientific and medical advancements with a view toward both improving our overall medical evaluations of airline pilots and toward modifying the Age 60 Rule when that proves feasible, it is the FAA's veiw that current knowledge still does not permit us to identify those pilots who can safely perform operations under part 121 past age 60.

You may be assured that we are sensitive to the nature of the rule as it applies to older Americans, and that we will take action to make appropriate changes to the rule whenever we determine that such changes can be made consistent with the needs of aviation safety. We have stated repeatedly that, when practical evaluation procedures allow us to identify those individual pilots who will not be an unacceptable risk to aviation safety beyond age 60, the Age 60 Rule will be amended. Until that time, however, the Age 60 Rule must remain in effect as a necessary measure to protect the safety of the American traveling public.

Mr. Chairman, that concludes my statement.

The CHAIRMAN. Thank you, Mr. Broderick. Since you are the last to have completed your statement, I would like to start the questioning with you.

May I say that I am somewhat confused, not knowing anything about medicine or physical examinations or anything of the kind. I would like to ask you some questions with regard to a statement you made where you say that you found no feasible safety alternative to the rule, and you went on to say that you found no medical advancement that would justify hiring a pilot after age 60. The question is, who determined that age 60 was a cutoff age? Was it done because of studies that were made medically? Or did someone just decide somewhere down the line that age 60 was enough?

In other words, I am asking you what is the reason for age 60? You see, I am past 60, so I am interested.

Mr. BRODERICK. Mr. Chairman, briefly stated, I think that the FAA back in the late 1950's reviewed all of the medical and scientific data, as well as all the accident data, and the forecast changes in the aviation system that would be occurring in the next decade or so. In reviewing that data it became quite clear that people's performance deteriorates, as a general statement, with age; that there needed to be, for safety reasons, some consideration given to that.

The Administrator, in a public rulemaking process, reached the conclusion that while, admittedly, age 60 is an arbitrary age, if one is to take into consideration these deteriorations in performance, these deteriorations in health, and the potential threats that they provided to aviation safety, some line had to be drawn. And in his best judgment at that time, the line was drawn at the age of 60.

The CHAIRMAN. But what I cannot understand is why it is possible for someone who is an alcoholic, for example, or who has had a coronary bypass, or has lost his hearing, but particularly a coronary bypass, to still pilot an airplane. And the FAA is able to determine that it is perfectly safe to allow a person to fly who may be both an alcoholic and have had a coronary bypass.

Is it true that there are pilots today that are alcoholics? You know, you cannot be a former alcoholic. Are there pilots who are alcoholics and have also had coronary bypasses?

Mr. BRODERICK. Mr. Chairman, at any opportunity to erase a generalization which can be replaced with some specific rationale, we do so. We know, understand quite well the progress——

The CHAIRMAN. Well, I am asking if you have pilots——

Mr. BRODERICK. Yes, it is true, sir.

The CHAIRMAN. All right. So it is true then. We have quite a situation here.

We have testimony from Dr. Williams, Dr. Koonce, and Dr. Fox. Dr. Williams, for example, told the committee that we can now conduct tests which will identify medical conditions which affect functioning and which would have gone unrecognized in the past. Are you aware of any of the new medical advancements that have been described by Dr. Williams?

Mr. BRODERICK. I am sorry, I do not quite understand the question. In terms of alcoholism, sir, or cardiac?

The CHAIRMAN. Certainly, both.

Mr. BRODERICK. Well, there are many new techniques for cardiac evaluation.

The CHAIRMAN. I am not asking that. I am asking whether or not the statement made by Dr. Williams is a correct statement. He said that we can now conduct tests which will identify medical conditions which affect functioning, and that these conditions would have gone unrecognized in the past. I am assuming that this is something new, that doctors can now recognize or identify the medical conditions which affect functioning.

I am asking you, Mr. Broderick, is the FAA aware of the progress that has been made by medicine?

Mr. BRODERICK. I am sure Dr. Williams is right. And the Federal Air Surgeon and his staff is continuously monitoring those advances every day. That is part of their job.

The CHAIRMAN. All right. If that is part of their job, are they applying that today? Are they using those new medical techniques to make determinations about functional ability?

Mr. BRODERICK. As is evidence in the granting of exemptions to people with cardiac problems, with alcohol problems and with vision problems, with a number of problems, when we identify a means to deal with a problem, we understand the progression of the disease, the possible threat that it might pose, and can assure ourselves—and this is the key point—that we can provide an equivalent level of safety with that person in the cockpit to one who would not have that disease, we would have no hesitation in certifying that person and putting that person in the cockpit.

Mr. RINALDO. Mr. Chairman.

The CHAIRMAN. Yes?

Mr. RINALDO. If you would yield for a moment. I notice from the namecard there that Dr. Frank Austin is present. He is the Federal Air Surgeon, as I understand it. And I think if Dr. Austin wants to respond to any of these questions of a medical nature, that he should be permitted to do so.

The CHAIRMAN. Yes, I understand. Dr. Frank Austin is also here to answer questions. It is my intention to ask questions of Dr. Frank Austin.

To follow up, perhaps these are questions that Dr. Austin should answer.

Dr. Austin, first of all, let us establish, are there new methods that can identify medical conditions which affect functioning?

Dr. AUSTIN. As Mr. Broderick said, of course, there are. And we are aware of them. And this is, this is exactly, what he has said is what we have done in certifying these people.

The CHAIRMAN. You see, what worries me, Dr. Austin, is, if I had my choice, and they told me, you are going to go around the world in an airplane with General Yeager or Captain Shaver or this other pilot who is only 40 years old, but he is an alcoholic——

Mr. BRODERICK. Former alcoholic.

The CHAIRMAN. You are never a former alcoholic.

An alcoholic, I would give you one guess as to whom I would chose.

Dr. AUSTIN. Well, perhaps. However, a recovering alcoholic is certainly, in the numbers we have in the community, is rather, rather substantial now after the number of years we have been doing it.

The CHAIRMAN. Well, don't you agree that there is no such thing as a recovered alcoholic?

Dr. AUSTIN. Oh, that is true.

The CHAIRMAN. All right.

Dr. AUSTIN. "Recovering" is the word we use, sir, in the business. And the thing is, what we did with that system is remove from the closet alcoholism. Before that it was tolerated. If anybody reported a person drinking beyond—not following the rules, and so forth, or a chronic alcoholic was identified, very often it was swept under the carpet. We put the program out, and now those people are identified, the ones that cannot rehabilitate and never drink again. And recovering means that they never drink again. So that recovering alcoholic is merely a discriminatory label you applied to him.

If they never drink again then they are not at a greater risk, we do not think they are, and we have proved it, than the other people.

The CHAIRMAN. Dr. Austin, I am a former social worker.

Dr. AUSTIN. Yes, sir.

The CHAIRMAN. So I have been around.

Dr. AUSTIN. Well.

The CHAIRMAN. What you have said is not a 100 percent true statement.

Dr. AUSTIN. What, that you have been around? What part of the statement, sir, is not right?

The CHAIRMAN. Sir?

Dr. AUSTIN. What part of the statement was not correct?

The CHAIRMAN. That a person who is a confirmed alcoholic——

Dr. AUSTIN. Diagnosed alcoholic.

The CHAIRMAN [continuing]. Recovering or diagnosed, will, 100 percent of the time, be able to stop drinking. A large percentage of recovering alcoholics fall by the wayside unless they join certain organizations that keep after them, and they keep involved in the movement. Those who stay involved are the people who succeed.

Dr. AUSTIN. Yes, sir.

The CHAIRMAN. Those that do not go into those organizations and do not stay in a program do not succeed.

Dr. AUSTIN. That's the way all of our alcoholics are, sir. They are in those programs monitored like you—I do not know whether you did it when you were in the social work, but we have a tighter program than even, than anybody our size in the world, to be sure those recovering alcoholics are safe.

I might point out that alcoholism is not a—we do not discriminate with age on that. If a person is any age, if they show us that they can have a good recovery program we will certify them no matter what their age is.

The CHAIRMAN. All right. Then maybe you can answer this question, doctor. Why age 60? Why not 62 or why not 59 or 58?

Dr. AUSTIN. Well, it was originally thought that 55 would be a good age. And some people still think that is. As a matter of fact, many of the airlines even today, some of the foreign ones, will not let people transition to advanced aircraft beyond the age 55.

The CHAIRMAN. Well, those who thought that 55 was the right age were probably in their 30's; is it not so?

Dr. AUSTIN. No. They were probably 70's or so. They were the board directors, I suppose.

The CHAIRMAN. Because everyone is looking——

Dr. AUSTIN. No, that was, that was the issue.

The CHAIRMAN. Everyone is looking, though, to take somebody else's job. Like they ask——

Dr. AUSTIN. Yes.

The CHAIRMAN [continuing]. In our respective districts, "When are you going to retire?" You just barely took the job and they want you to retire already.

I am sure that is also true of pilots. Those who are starting would like to take that job. If you retire at 55 that makes that position open for them even sooner.

What I am looking for is the justification for age 60.

Dr. AUSTIN. As Mr. Broderick——

The CHAIRMAN. I have not been able to find it yet.

Dr. AUSTIN. As Mr. Broderick said, it was a summation of an extensive study and they came up with an arbitrary age. It could have well been 55. It could have well been 65 if they had so been inclined. At the time 60 was chosen, and we have found no medical reasons, as has been amply stated, to change that.

The CHAIRMAN. All right. We have established then that age 60 is an arbitrary age?

Dr. AUSTIN. Absolutely, sir. We have told you that.

The CHAIRMAN. And there is absolutely no medical reason for—

Dr. AUSTIN. No. No, I won't say that.

The CHAIRMAN [continuing]. Establishing that, age 60 as the retirement age?

Dr. AUSTIN. Well, there was a lot of medical input to the whole thing. But it was age 60.

The CHAIRMAN. Well, isn't the health of the pilot the most important thing?

Dr. AUSTIN. Yes, sir. Well, his skill is a little bit more important than health.

The CHAIRMAN. Well, of course.

Dr. AUSTIN. A sick pilot could fly a 747.

The CHAIRMAN. Of course. He could not be a pilot if he was not skillful.

Dr. AUSTIN. I don't know. I have seen some pretty unskillful ones. Chuck, have you?

The CHAIRMAN. No, I——

Dr. AUSTIN. I am not being facetious, sir. The——

The CHAIRMAN. Are you trying to tell me——

Dr. AUSTIN [continuing]. Health is very important. And of course, we do know that medical factors and physical incapacitation due to medical factors is a low, a very rare instance cause of accidents. But it is still a significant one that we have to deal with.

The CHAIRMAN. All right. In review before I ask Mr. Rinaldo to take his time, what we have established is that age 60 was just an arbitrary age that was picked and was not based on scientific evidence or chosen by a scientific method. Age 60 was established in an arbitrary manner.

We established also that there are those who think it should be lower and some who think it should be higher.

We also have established the fact that there is a new system, new ways of making a determination with regard to the capability of the individual to function effectively. Have we established that? Is there such a method?

Dr. AUSTIN. No, sir. I do not think so.

Mr. Broderick has a comment.

The CHAIRMAN. Dr. Williams, didn't you tell the committee that we do have such a method?

Dr. WILLIAMS. Yes, sir. I reported, and I believe borne out by the testimony of Dr. Koonce and Dr. Fox, that in the last 2 years we have had considerable advances in our capabilities of measuring numerous organ functions and have shown, as the testimony indicates, that the functioning, absent disease, in virtually every system of the body is very well maintained into late years.

So I would say yes, sir, as my testimony indicates, there are advances in the capability.

The CHAIRMAN. Dr. Koonce, do you agree?

Mr. KOONCE. Yes, sir. I do agree with Dr. Williams' statement.

The CHAIRMAN. Dr. Fox.

Dr. FOX. Most certainly in the area in which I am competent, cardiovascular disease. Yes, sir.

The CHAIRMAN. Dr. Austin, however, does not seem to agree.

Dr. AUSTIN. Well, no, sir. I agree entirely with what they have said. The problem we face is that the heart does not fly the airplane, the brain does not fly it, the kidney does not fly the airplane. It is a very complex body, a human being, that flies the airplane, made up of these talented gentlemen. And although we can identify individuals that have, a group of individuals that have a risk, which you have even reduced in your declining—by doing more and more tests reduce it to even 1 percent, that is still a risk analysis against a group of individuals.

And to identify precisely that one individual that you can say, next week, fellow, you are going to do it, is going to be difficult.

We feel like that we would like to have a little more than that. And as Mr. Broderick noted, we are still looking, and it might come someday.

The **CHAIRMAN**. Mr. Rinaldo.

Mr. **RINALDO**. Thank you very much, Mr. Chairman.

Mr. Chairman, I understand a couple of minutes before I arrived here, you decided not to allow opening statements. Just to lay the foundation for a couple of questions I want to ask, I would like to make a couple comments at the outset.

I want to begin by stressing that I am a strong opponent of age discrimination and that, as you know, Mr. Chairman, you, Congressman Pepper and I have introduced legislation to amend the Age Discrimination in Employment Act to prohibit mandatory retirement at any age for virtually all occupations.

I think to put this hearing in focus, however, we have to recognize that the key question today that we face is not simply whether or not anyone opposes age discrimination. We, I think, as Members of Congress, owe a legal and moral obligation to the flying public to be absolutely certain of the safety of eliminating the Age 60 Rule before we tamper with a regulation which has given us such a high degree of safety.

Congress has required the FAA to ensure that all airline companies, and I am going to quote, "perform their services with the highest possible degree of safety in the public interest." Those words are quoted directly from the law, as you recognize, Mr. Chairman. And I think all of us ought to bear them in mind as we reflect on this very, very difficult issue.

I am not locked into any one position. But let me give you some of the things that have intrigued me so far this morning.

Dr. Williams quoted a study of the pilot retirement age done by the National Institute on Aging in 1981, that found, in effect, Doctor, as you said, no convincing medical evidence to support age 60 or any other specific age for mandatory retirement. Is that correct?

Dr. **WILLIAMS**. Yes, sir.

Mr. **RINALDO**. Now, that is a point that those against the rule use in their arguments.

On the other hand, if you read the NIA study in its entirety, you will find out that they specifically recommended that the present age limit for pilots and first officers be retained. Let me quote that part of the study which heretofore was not quoted at this hearing.

It says:

> Aircraft accidents attributed to acute or subtle incapacitation from disorders associated with aging have occurred in the United States and elsewhere. The available actuarial and epidemiological data suggest that the probability of such accidents will increase if the age limit is increased.

Do you recognize that statement from the report, Dr. Williams?

Dr. **WILLIAMS**. That is direct from the report, yes, sir.

Mr. RINALDO. Thank you. The NIA study further concluded that no medical or performance appraisal system now exists which could serve as a safe substitute for the Age 60 Rule.

And, you know, I listened to a number of physicians here this morning, doctors testify that there is a new system. Yet, in preparation for this hearing I have read numerous reports by doctors who would say right off the bat that there is no new system.

I want to quote, for example, from a letter from a highly respected physician, Dr. Earl Carter, an M.D. and a Ph.D., a professor of preventive medicine at the very highly respected Mayo Clinic in Rochester, MN, who stated,

> The big issue is whether or not we have the technical methodology to select specific individuals on a functional basis rather than on the basis of the calendar. I maintain that we do not as yet have this scientific competence and, thus, must retain the arbitrary position of selecting an age of retirement.

[The letter referred to by Representative Rinaldo follows:]

MAYO CLINIC, *July 6, 1979.*

H. GRADY GATLIN, M.D.,
Director—Operations, Air Transport Association of America, Washington, DC.

DEAR GRADY: Again with regrets at my inability to attend the hearings set for next week because of a firm commitment that I cannot change, I should like very much to provide the following comments concerning your communication to me of June 22 in which you referred to me copies of the prepared statement by Stan Mohler relative to the age 60 retirement issue.

I shall simply go through this document and comment on various areas to which you can refer on your own copy. On page 58 in the fourth paragraph Stan makes the correct point that "individuals differ markedly in changing with the passage of time". No one has ever disputed this. The big issue is how to find which ones have changed the least in terms of qualification for flying.

Indeed, the remainder of his comments on the first paragraph on page 58 seem to imply that the FAA has taken chronological age as an absolute. The FAA and all of us including Stan have long recognized that the calendar alone is only a single index of the aging process and not necessarily correlated with function or so-called "functional age". Everyone recognizes there are individuals age 55 who are far "older" than individuals age 65 in terms of ability to operate an aircraft. We are not challenging this concept and it is unfair to imply that we have lost site of this obvious truth. We are not questioning the obvious.

We are only raising the supreme question as to how we go about detecting those individuals whose natural aging process has not gone beyond the bounds of acceptable air safety factors. Everyone knows that the current age 60 retirement rule will indeed eliminate a man perfectly competent to continue on flying. But, at the same time it also eliminates individuals who are indeed ready for retirement. Again, the big issue is whether or not we have the technical methodology to select specifically individuals on a functional basis rather than on the basis of the calendar. I maintain that we do not as yet have this scientific competence and thus must retain the arbitrary position of selecting an age of retirement for lack of a more "scientific approach".

Stan himself in his own publication in 1973 staunchly defended the age 60 retirement rule. And, reading his article carefully will reveal that he based his position not only on the cardiovascular factors involved but also on factors related to the integrity of the central nervous system. He did not neglect psychometric factors, in other words, in his own 1973 publication supporting age 60 retirement.

Accordingly, Stan must now base his current position on data gathered subsequent to his report of 1973 for there is no other rational basis which one could use to explain his change of position.

Now, as one carefully reads Stan's position it is clear that he is banking heavily on studies accomplished by Doctor Bruce as summarized on page 57 of Stan's statement. As I have stated before, if a pilot were essentially "a flying heart" then we would indeed have an entirely different problem and certainly would have a much simpler task in selecting pilots to fly beyond age 60. Stan is resting heavily upon the need of cardiovascular fitness as clearly indicated in his statement. Again, cardiovascular fitness alone hardly constitutes the total requirement matrix for the safe operation of an aircraft.

With these general statements in mind I should like to make a few specific comments with respect to page 57 of the Mohler statement.

In the second paragraph he states that each pilot has a "longitudinal record of flight performance which is available". I doubt that anyone could ever show a correlation between aircraft accidents and the "performance record" of a pilot. It has been my experience over the years that invariably when a given airline company makes a statement following an accident it always seems to be "one of our best pilots". And, with respect to flight testing as measures of continued competence this presumes that those functions accomplished during the flight test procedure are highly correlated to the ability of the pilot to react in an emergency particularly when it is almost inevitable he is to encounter a situation unique and not within his previous experience. I think it is quite clear that a perusal over the last several dozen of U.S. airline accidents that each were quite unique requiring prompt and "original" action on the part of the pilot. I question whether the "routine proficiency testing" is necessarily a guaranteed assurance that the pilot can perform well under unrehearsed and uniquely new situations. Any of us airline medical directors can tell you examples of pilots flying today who continue to amaze us at being able to maintain their proficiency ratings. While the proficiency check is obviously crucial I question whether or not it is a perfect enough instrument to protect us from a lack of originality in the prompt and correct solution of totally new problems. This latter ability is definitely affected by the aging process and ultimately experience no longer over-rides the deleterious effects of aging on our ability to process totally new data to solve a totally new problem.

In the third paragraph of page 57 Stan points out that the age 60 retirement rule is "arbitrary". To be sure it was based upon the best knowledge available at the time. And, if one goes over the original data gathered for this purpose one will quickly see that the study group could have set the retirement age at 55 as easily as age 60 on the basis of the data available then! The original study group has never denied the prominent role played by "best clinical judgement" in arriving at the retirement age of 60. But, it was really set on the generous side if one simply peruses the data with respect to cardiovascular and cerebrovascular disease in the U.S. population as a function of age.

Stan points out that there are at least 50 individuals over age 70 carrying a Class I Airman's Medical Certificate. Again, is this alone an adequate criterion for operating as an airline pilot. I am sure that we could find individuals age 80 right now who could pass a Class I Airman's examination. But, how many would wish to have them operate as an airline captain!

In the fourth paragraph on page 57 Stan points out inadequacy of requirements for the FAA examination. For example, he correctly points out that certain blood testing is not done, chest x-rays are not done, smoking history and obesity are not considered and so forth. He is entirely correct and Stan should know that the only reason these factors have not been introduced long ago is because of the fierce pressure brought to bear against the FAA both by ALPA and AOPA. I myself was in the midst of a fierce controversy when Pete Siegle tried to add the stress ECG as an examining procedure for the more elderly commercial pilots. The blame for the perfunctory nature of the current flying examination must rest squarely on the pilot population and not on the FAA or those in aviation medicine.

On page 58 Stan referred to our work here (Orford and Carter) in the fifth paragraph. Our work was not oriented toward the aging process per se but rather to the fact that the airline pilot appeared to behave like the nonflying population when corrected for age and it was seen that the pilots enjoyed morbidity and mortality very similar to their nonflying cohorts simply because the threats to health these days is lifestyle manifested in terms of smoking, obesity, high blood lipids and sedentary existence. Our work actually showed that the professional airline pilot was not very different from his nonflying upper middle class counterpart.

On page 59 in the third and fourth paragraphs Stan refers to research done on the aging process and criticized previously reported work (e.g. Spirduse and Clifford) on the basis that it was inappropriate to compare the elderly group to the young group because the elderly group by the time they became older would have been afflicted with disease and possibly depression. Certainly this is true but the younger population certainly is not immune to such factors either. Accordingly, if one were to eliminate disease and depressed individuals from the older group one would have to do precisely the same selection with respect to the younger age group and remove the depressed and the ill from that group as well. And, I would be willing to bet that the young group so selected would still do better than the older group selected in a similar fashion with respect to the parameters tested related to psychomotor function.

This same statistical problem applies to the comments on the same page related to the "thousand aviator study" and other related work. It simply is not valid to compare these "thousand aviators" to the general population without first getting a "general population" well matched in terms of age, ethnic background, and several other important cultural behavioral factors. To come at it another way, if the aviators do fare better than the general population, proper analysis should identify some differential factor(s) to account for this. It is always difficult to compare pilots to nonpilots because of the tendency to eliminate persons who develop disease from the pilot group and again to be certain of appropriate match in terms of demographic factors as well.

The comments on the top of page 60 represent "testimonials" which really are of no value in trying to ascertain a scientific issue. All of us can recount remarkable cases of anything. All of us admit that there are airline pilots flying today who would probably be competent to fly until age 80. But again, the big problem is that we have no reliable way now to pick these men out in advance. And, to reiterate, measurement of cardiac function alone is not the answer. I have in my practice many a patient with a splendid cardiovascular system who is overtly senile because of specific cerebrovascular changes. Just two weeks ago I saw an airline pilot who performed beautiful on the treadmill but who no longer can read above the sixth grade level! And, I might mention that his neurological examination is negative. It took a CT scan with contrast to demonstrate his early Alzheimer's disease.

Well, again I hope the above comments will be helpful to you and I certainly regret at being unable to be with you personally during the week of July 16.

Please feel free to call me by telephone anytime except during the week of July 16.

With warmest personal regards.

Sincerely,

EARL T. CARTER, M.D., PH.D.

Mr. RINALDO. So I think that proves, wouldn't you say, Dr. Williams, that there is, still to this day, a diversity of opinion in the medical community?

Dr. WILLIAMS. I think you would have to accept that there is a diversity of opinion. I would simply add that the careful study of the NIA, commissioned first to the Institute of Medicine, and I was a member of the Institute of Medicine original study, and then followed by the NIA panel, concluded that as a consensus of that careful study that there was no basis, medical basis, for an arbitrary rule of an arbitrary age for determining competence of pilot performance.

Mr. RINALDO. Yes, but they still determined, and that is the bottom line at this point, that as of the time of this study that age 60 should be retained.

Dr. WILLIAMS. If I might just add, Mr. Rinaldo, they specifically recommended that studies be undertaken to determine the effectiveness of substituting functional assessment for the age 60 rule. They did not stop with simply saying as of now leave the age 60 rule.

Mr. RINALDO. Yes.

Dr. WILLIAMS. But they specifically requested or recommended that we move toward functional assessment as our basis.

Mr. RINALDO. I agree with that. I agree with that completely.

You know, one of the problems is if the age 60 rule is repealed, airline pilots will not be subject to retirement until age 70, according to the terms of the Age Discrimination in Employment Act. Now, you know, based on everything I have heard this morning, wouldn't you say that, and I will ask General Yeager that question, wouldn't you say that age 70 is just as arbitrary as age 60.

General **Yeager**. If you just select it for that purpose, yes, sir.

Mr. **Rinaldo**. Would you say that age 80 is just as abritrator—arbitrary?

General **Yeager**. To get around to the meat of the problem, Mr. Rinaldo, you have got an awful lot of pilots reaching age 60. And in my opinion, we have the capability of evaluating and eliminating those pilots that should be eliminated for safety purposes only.

Mr. **Rinaldo**. All right.

General **Yeager**. Let me finish the statement. And in my opinion there was a tremendous amount of money spent in training all of these air crews. And just to arbitrarily ground them at age 60 because of that age in my opinion really does not make good economical sense.

Mr. **Rinaldo**. All right. Then I would like to ask you one other question. You said we have the capability. Would you tell me what tests we should use?

General **Yeager**. In my opinion, all pilots, airline pilots who reach age 60 should be evaluated by a board of doctors and, if necessary, evaluate them through the thallium test, muga test, and CAT scan test, if it is necessary, or if they have any indication of any failure of their physiological capability. And we, in the Air Force, when a pilot is picked up at a physical with a discrepancy, is sent to the School of Aviation Medicine and evaluated, and either put back on flying status or permanently grounded.

Now, to me it is a waste of money to arbitrarily ground a pilot because he is 60 years of age, because in my opinion we have the medical capability of evaluating pilots and picking out those who would be a safety risk.

Mr. **Rinaldo**. I respect your opinion. On the other hand, there are very eminent physicians who agree that we do not have that capability.

Let me ask you another question along that same line of reasoning. If we evaluate pilots at age 60, when do we evaluate them again, at what age, in your opinion?

General **Yeager**. Well, you evaluate—In my opinion you do not let them get away with anything because they reach, reach age 60. The point is we evaluate them in accordance with FAA regulations. And that is every 6 months they have to pass a class one physical.

Mr. **Rinaldo**. Do we, suppose a pilot is 90, do we still keep evaluating him?

General **Yeager**. As long as he demonstrates a capability to operate his equipment?

Mr. **Rinaldo**. A hundred years old? You would have a 100-year-old man flying an airplane?

General **Yeager**. Age means nothing, Mr. Rinaldo.

Mr. **Rinaldo**. I want to ask Captain Shaver one question because it interested me. Twice in your testimony, Captain, you said you are testifying, and I am quoting you directly because I wrote it down, "on behalf of 20 million members of AARP."

Now, quite frankly, I brought some of this material home last weekend. My father is 78 years old, and thank God in relatively good health, and he read some of it. And he is a member of AARP. And he does not agree that the rule should be changed until such time as there is almost complete unanimity on the part of the medical community that there is a workable and accurate test that virtually all professionals in the medical community agree is a good test. So I think the record should show that when you say that you are testifying on behalf of 20 million people, that is an erroneous statement.

Let me ask you this. Was a poll taken of the members of AARP?

Mr. **Shaver**. Mr. Rinaldo, I do not know. I was asked by the AARP to represent them and speak on their behalf by the staff. And this was read with great detail, word for word, and approved by them.

I would like to ask you, sir, with all respect, you speak for the constituency of your district, and do you represent that all of the people in your district are for what you say? I mean, we are in the same boat, I think.

Mr. **Rinaldo** As I said before, if we can safely abolish the age 60 rule, fine. I have not yet seen clear and convincing evidence that we can do so at this time. I take a poll of the voters in my district every 2 years, and so far they have reelected me six times. But I will bet that if I took a poll and asked my constituents how many people would want to fly in an airplane with a 100-year-old pilot, very, very few of them would want to take that risk.

I have no further questions, Mr. Chairman.

Mr. **Shaver**. Interesting discussion.

The **Chairman**. The Chair recognizes Mr. Stallings.

Mr. **Stallings**. No questions at this time, Mr. Chairman.

The **Chairman**. Mr. Lightfoot?

Mr. **Lightfoot**. Thank you, Mr. Chairman.

I approach this with somewhat mixed emotions, as I share a bit of a background with some of the gentlemen at the table. I am a flight instructor and a pilot. And I had an opportunity at one time to fly the F-16 on a demonstration ride, and I have flown some of the sophisticated simulators that you talk about, particularly the 727. Also, I have a father who is 74 years of age and still an active farmer. He decided he would wear out instead of rust out. Although, quite frankly, I am not real happy riding with him in an automobile.

And I guess one of the satisfactions of instructing people to fly is to walk on an airliner someday and recognize the name on the door as some young student that you saw hanging over a fence when he was 13 or 14 years of age. That happened to me once, and I considered very seriously taking the bus.

But I think what it boils down to is what the gentleman, Dr. Austin, was talking about with the FAA. That is, regardless of what the health status might be, the prime criteria on a pilot is judgment, which is something that is extremely difficult to test or evaluate. And you gentlemen are here because you have exercised good judgment; you probably had a few close calls and learned from them. That is why you are still here today.

So I agree with Mr. Rinaldo's position on age discrimination. That is, why do we just pick an age and nobody is any good after that point or prior to that point?

This issue, I guess, will be settled before the committee that Mr. Boehlert and I serve on, which is the Aviation Subcommittee. Listening to the conversation this morning, would it be a fair assessment to say that the disagreement really is over the evaluation standards that we use, going along with what the general mentioned a moment ago, that is, starting at an arbitrary age and letting each individual prove their worth at that point? Is this basically, when we get underneath all the rhetoric, where the real disagreement lies?

Mr. BRODERICK. I think so, sir. It is a question of what to measure, how to measure it reliably, so that the result, which is essentially 99.999 percent of all our flights every day end without incident, so that that result is not disturbed.

Mr. LIGHTFOOT. So in the end—to serve the flying public, the pilots, all of us that are involved—from the FAA perspective, what would these gentlemen have to bring to you as an argument that they do have the proper evaluation to do that type of thing now? A combination of what the general has mentioned with the Air Force? With what these gentlemen have done? Where should we go? What should we be looking at in a positive way to arrive at a solution to this issue?

Mr. BRODERICK. I think Dr. Austin could probably outline for you a couple of the areas that generally cover human factors as a whole. It is not one thing. It is not merely heart or kidney or lung. It is everything all put together. And more importantly, it is knowing what to measure to indicate that pilots will perform safely and predict when they will not perform safely, and be able to segregate those two groups.

Mr. RINALDO. Will the gentleman yield for a unanimous-consent request?

Mr. LIGHTFOOT. Certainly.

Mr. RINALDO. Mr. Chairman, this hearing is becoming increasingly more interesting as it goes on. And I want to compliment the gentleman for the question he just asked because I think he really got to the real core of the problem.

And I would request unanimous consent at this time that the record remain open for 30 days so that the doctors who are testifying here will have an opportunity to submit on the record the exact test that they feel is capable of properly measuring a person's ability to perform as an airline pilot so that we can have it on the record and the committee will be able to avail themselves of that information.

At the present time I do not think in any of the testimony we were given the exact test that you all agree on is the test that should be used.

The CHAIRMAN. All right. Without objection it will be the order.

May I remind the gentleman that a hearing we held almost a year ago, was concluded, and it was decided that both the FAA and the pilots' organizations meet to discuss the proper examination to measure performance. After they had met and discussed it and agreed on some measure, they would submit it to the committee. I just asked whether or not that meeting ever took place? The answer is no, the meeting never took place.

We recognized some time ago that this should be done. Now we are back at the same point.

Mr. RINALDO. We are back at a little different point, Mr. Chairman.

The CHAIRMAN. No, we are not.

Mr. RINALDO. This time we are asking the doctors to do it. I think it is different to have the doctors and the Airline Pilots' Association, for example, meeting to work out a plan. Here we want the doctors to come up and give us the plan that you think accurately and reliably measures future performance based on the medical characteristics of the individual being tested.

The CHAIRMAN. Well, that is exactly what was asked before. We wanted the doctors on both sides to meet and make the recommendations to the committee. I hope that will take place sometime, Dr. Austin. It has not happened. I hope that it does.

Dr. AUSTIN. Well, I hate to be classified as a doctor on one side or the other. I hope we can unanimously work together with all the community. And we certainly try.

I recall—and I was not around since I just came aboard October 1984—there was an NPRM put out in response to this business, and it suggested some ways that this could be done for public response and so forth, and it was turned down. So we have done, we have done some things. We have gone out with a public rulemaking process and done some things.

And of course, there are lots of things in the medical community.

Now, another thing, and Dr. Carter's name came up. Dr. Carter is on the Risk Committee of the—besides being an aerospace medicine specialist, he is also a cardiologist—he is on the Risk Committee of the AMA contract that the FAA has gone out for to evaluate the standards for airline—for pilots, not airline pilots, everybody. That contract will be reported out in February 1986. It will be available for the public.

And that is going to be a rather extensive treatise on the state-of-the-art and the standards. Many of the tests which were referred to here and the need for us to do these, we have never been able to convince a pilot who is qualified according to our flight physical, when we see that he is smoking or has a high cholesterol or does not exercise, and all those other good risk factors that Dr. Fox and the others talk about, we have not convinced him that it is in his best—that he is required to go and get one of the blood tests or something like that. Many times we get the tests if there is some other factor that we can find him disqualified for.

So we have been using those tests very extensively to qualify the people that we have. And we qualify those regardless of age.

If a person comes in, passes a flight physical, and then if they have a disqualification we go through all the thallium scans and the risk analysis type tests and find them qualified and I feel that they would not be an impact on safety, we will certify them with any class of certificate they want, no matter what the age. And several of the people, many of the people here carry their first class, second-class and third-class certificates beyond the age of 60.

The CHAIRMAN. Mr. Lightfoot.

Dr. AUSTIN. That is for individual, individual people that we have certified. That does not change in any way the feeling for air carriers, of course, which is a different rule entirely. And I cannot waive that rule. That is not a medical rule.

The CHAIRMAN. Mr. Lightfoot, do you have any other questions?

Mr. LIGHTFOOT. No, Mr. Chairman. I think that pretty well answers it. What we all want to do in the end is to achieve maximum safety for the flying public and let pilots perform for as long as they can.

As Captain Shaver, I think, alluded to, there tends to be a little bit of a love affair between the men and the machines—the only one my wife will allow in our household. And it is a terrible thing to have good talent be wasted down the road. And I think that is what we need to work toward to ensure it does not happen.

And I appreciate the questions this morning. Thank you.

The CHAIRMAN. Thank you.

Mr. Tauke?

Mr. TAUKE. Thank you, Mr. Chairman.

Dr. Austin, what kind of tests do you perform in order to recertify a pilot who is recovering from a major illness?

Dr. AUSTIN. We depend upon the specialists to decide clinically what they need, plus, we lay on some minimums for ourselves. If a person has had a heart attack, myocardial infarction, we know they have arteriosclerotic heart disease most likely, and we ask them to, after they have recovered, we look at all their hospital records to see the extent of it, have them, like they do down at Brooks and at Pensacola, have all the specialists, if it is indicated, the opthalmologist, the cardiologist, the neurologist, anybody that there may be a system involved, give us an opinion. And we do these exotic tests in every increasing complexity, as indicated by them being positive or negative, that was discussed earlier.

Mr. TAUKE. Well, is there a greater risk that an individual who has had a heart attack will have another heart attack?

Dr. AUSTIN. Strangely enough, among our pilot population, and I think it would be borne out in the private population, once a person has a heart attack it is God's way of telling you to slow down. And they change their lifestyle. Particularly the pilots if they have them, most of them, of course, will occur 40, 45, 50, 55, they do not have them again. If they do, they have not changed their lifestyle enough.

And, of course, the thing that has come about lately, is surgical correction, invasive percutaneous angioplasty and bypass surgery.

One of the interesting things that has happened in that arena, and this is certainly an advancement that we have statistically proved in the last few years—or it has been statistically proven, we have not, of course—is that people who have therapy reduce their risk of sudden death, as one criteria, by 75 percent in some categories because they, because they have the proper therapy, and also probably because they change their lifestyle: quit smoking, exercise, lower their cholesterol and control their blood sugar.

Mr. TAUKE. I guess it would seem to me—and maybe tell me where my logic is wrong—if an individual has a major illness it probably, and they then come back as pilots, there probably is some danger that that group, the group that has had a major illness, would not perform as well as those individuals who have not had a major illness. You conduct tests, obviously, to determine that some members of that group who have had major illnesses are capable of performing. And yet when it comes to the over 60 population, it appears as if you are not willing to make those same kinds of judgments that there you have a group, too, where the risk is undoubtedly higher than for the under-50 group.

Dr. AUSTIN. No, sir. As I pointed out, from the purely standpoint of certification for class one, two and three under our present regulation, and that does not mean it might not change, that we, we do the tests regardless of age and we give them the ticket if we feel that they are safe. The issue is——

Mr. TAUKE. But it is not regardless of age because you do not do it for people over 60.

Dr. AUSTIN. Oh, yes, sir. We, we give a first-class ticket to the man who is qualified over 60.

Mr. TAUKE. Oh, pardon me.

Dr. AUSTIN. Seventy, 88. But there is still, in another arena, if you will, apart from all that, that is why it is a little bit out of context to start talking about how we certify all these folks that are basically under 60, the pilots that we return to the cockpit. And I think all the people involved are happy we are doing that, and feel that it is safe. And we heard that comment. It is a little out of context, the concern of the FAA goes beyond the medical issue. It is a safety issue and reliance and a total reliance on safety. And that would be Mr. Broderick's point.

Mr. TAUKE. Well, I understand that. But it is still the same safety question for the 55-year-old pilot who has had a heart attack. And I guess there you have a group of individuals who perhaps have a potentially higher incidence of danger and but yet you make a judgment that some of them can go back into the cockpit.

What I do not understand is why can't those same tests we used to determine whether an individual who is 62 can be in the cockpit?

Mr. BRODERICK. Sir, because the cardiology situation is only one small part of overall flight performance. And I think the answer to the question in layman's terms, which are the only terms I can give you, is as follows: we understand a lot more about very specific diseases in certain areas. There are some diseases and some incidences of incapacitation or illness for which we have no satisfactory explanation, cannot assure ourselves of the safety of that pilot, and the pilot will not get certified. So it is not in every case.

If we understand the disease, if we understand the progression, and we apply adequate testing to assure ourselves that that pilot over the next 6 months or 1 year has an equivalent level of safety performance to a pilot who is otherwise healthy, then we will in fact certify that pilot and allow that pilot to fly. We understand what to measure, how to measure it, and it is a medically accepted way of doing things.

The point is with regard to the other factors, the physiological, psychological factors, that are known to degrade after—with age, at any age, after age 40, we do not understand how to measure those. We do not even understand which are the most important ones to measure.

Mr. TAUKE. Let me ask one additional thing in relationship to that.

Dr. Austin, what do you—you indicate that you are always looking at new tests and trying to find ways to measure these things.

How do you keep track of the advancements in the medical community?

Dr. AUSTIN. Like everybody else in the medical community, read the literature, and people write us letters, tell us about them frequently.

Mr. TAUKE. Do you have any kind of group you——

Dr. AUSTIN. Well, the AMA group now we convened has been in process for a year now, very extensive in all the specialty areas.

Mr. TAUKE. And they are looking at this specific issue?

Dr. AUSTIN. At the standards. No, not at age 60. No. They are looking at our standards which—our medical standards for certification one, two and three.

Mr. TAUKE. OK. But what I am wanting, I guess the point that Mr. Lightfoot made that I think I concur with is that the question seems to be, do we have a test which can determine whether or not someone over age 60 is capable? And I am wondering how——

Dr. AUSTIN. Capable of what?

Mr. TAUKE. These gentlemen have said—of flying a plane.

Dr. AUSTIN. Thank you.

Mr. TAUKE. These gentlemen have indicated that they think there are these kinds of tests. You say there are not those kinds of tests. I want to know what you do in order to make that determination that you are right and they are wrong?

Dr. AUSTIN. Cannot prove the negative, Mr. Broderick says. And I agree with that. My opinion.

Mr. TAUKE. Is there anybody else besides you who makes the judgment as to——

Dr. AUSTIN. There's one or two other people that have that opinion. And we have certainly a lot of people to consult with.

The Aerospace Medical Association, the primary association for medicine knowledge and expertise, wrestled with this back in the old days. And they were split. Maybe not down the middle, but certainly split.

Mr. TAUKE. One more question, if I may, Mr. Chairman. The American Airline Pilots' Association apparently is in favor of the age 60 rule. And nobody from the group would testify today. But, Captain Shaver, are you a member of the ALPA?

Mr. SHAVER. I was for 38 years, but since they have been using my dues money to fight the age-60 situation in court I ceased being a member. They do not really like me right now.

Mr. TAUKE. Do you know, do you know on what basis the ALPA has made that—taken that position? Is it on the basis of a poll of members? Do the majority support it? Is it on the basis of some other principle?

Mr. SHAVER. Well, until the midsixties or early sixties, ALPA was very much against the age-60 rule. However, there are many more young members of ALPA than there are older ones. And when I first became a member of ALPA, captains had a full vote, first officers, copilots, had half a vote. And soon after I joined we voted to be very democratic and allow first officers or copilots to have a full vote. Later we ended up with a third man in the cockpit even younger who also has a full vote. So it is two against one. The two younger people in the cockpit want that old guy out of there so they can have his job. That's the nuts and bolts of it.

[The following material was subsequently received from Mr. Shaver:]

To answer your question, Mr. Tauke, ALPA has not taken an official poll of its membership on the issue of the Age 60 Rule. According to testimony presented to the Aviation Subcommittee on July 19, 1979, by Captain John J. O'Donnell, ALPA had opposed mandatory retirement based solely on age from 1936. He said the Association had maintained and strenthened its policy of opposing such mandatory retirement on a number of occasions. In November 1980, ALPA's Board of Directors changed its longstanding policy to one which supported mandatory retirement at age 60 for all cockpit positions.

During the 1979 hearing, Captain O'Donnell said, "Anyone can get any poll to say anything they wanted." He said, "I would not encourage polls of the membership because there is no way to educate them (the pilots) and no matter who wrote it, you will get some bias written into the polls." The pilots on three individual airlines have taken "straw-polls" on the matter. Two of the polls showed that 60 percent of those responding favored keeping the Age 60 Rule, and the other showed only 40 percent of the respondents favored the rule. At this time, I personally feel there seem to be a swing back toward the Association's original opposition of the rule. As with any question, there will always be those who are opposed and those in favor, but I do not believe that ALPA speaks for every pilot on this or any other issue.

Mr. TAUKE. Are there more pilots than there are jobs? What is the, I guess, what is the employment situation?

Mr. SHAVER. Well, right now there is a shortage of pilots. In fact, my schedule is to fly from Chicago to Honolulu and back, normally. But because United is so short of pilots in Los Angeles, 747 pilots, they are calling people out on days off, trying to cancel vacations, asking us to fly 90 hours a month. So now I go to Honolulu and then I fly to Los Angeles to fly a trip that normally Los Angeles flies.

Mr. TAUKE. Well, that is something, isn't it. Dr. Austin, have you thought of, have you compared the danger of having a tired pilot fly versus the danger of having someone 61 or 62?

Dr. AUSTIN. This has been looked at very extensively. And we just had a rule that went into effect about time, time in the cockpit.

Mr. TAUKE. Then let me just ask one more question. This is my last one.

Dr. AUSTIN. A tired old pilot is more difficult for us to handle.

Mr. TAUKE. Obviously, 60 was pretty arbitrary when that was adopted in 1959. A lot has happened medically and to our longevity since 1959. Would it make more sense to make it 61, or 62, 63 today?

Dr. AUSTIN. It would be just as arbitrary. And I do not think the proponents of the rule who I have had some discussion with are really much in favor of arbitrarily setting it, as a principle. But it is a possibility. And I suppose that could be looked at if Congress is going to take a look at it. We do not—we will deal with it when it comes up.

Mr. TAUKE. Thank you.

The CHAIRMAN. Thank you, Mr. Tauke.

Mr. Boehlert?

Mr. BOEHLERT. Thank you, Mr. Chairman.

We tend to think we have all the answers. And I do not think we know all the questions.

What do we do, Mr. Broderick, in terms of international consultations? What are they doing in other nations, for example? Do they have an age 60 rule?

Mr. **Broderick**. The International Civil Aviation Organization has a rule which is modeled after that in the Federal Aviation Administration, essentially the same for all practical purposes, all other airlines adopt that and operate that way.

Mr. **Boehlert**. Modeled after our rule?

Mr. **Broderick**. Yes, sir.

Mr. **Boehlert**. Are there conferences? Is this the subject of continuing discussion? Or do we require a hearing of this nature before it comes to the fore again? In other words, are you talking with your counterparts in other nations? And is Dr. Austin at your side? Do you have this type of consultation? I do not ascribe any sinister motives to the FAA at all. I can understand ALPA's reasoning, despite all their phrases, and I can understand ATC. I mean, they would rather have a lower, lower paid junior pilot than a senior guy like Captain Shaver because it saves on the bottom line. But I do not ascribe any sinister motives to FAA; I think you are sincere.

But wouldn't it be wise to have the consultations with your counterparts in other countries, and Dr. Austin by your side to——

Mr. **Broderick**. Mr. Boehlert, we do that. We do it in several ways: in membership on the ICAO's licensing panel; in membership on their medical committees; in various meetings at ICAO which we are very active in, we do so. In addition, the community, through the International Air Transport Association, the International Federation of Airline Pilots Associations, et cetera, there is a continuing dialogue in the flying community.

The International Aerospace Medical Groups meet all the time, too. So this is the kind of thing that, as Dr. Austin mentioned earlier, is part of the continuing professional dialogue in this field. And it is something that comes up in greater or lesser degree all the time; just another subject of continuing discussion and effort on everybody's part.

Mr. **Boehlert**. On page 4 of your statement you make reference to a June 1983 study. I was wondering about the correlation of figures in terms of private pilots' accident rate, age 60 and beyond versus those who are not age 60. Is there any compelling evidence that leads you to conclude that if you are up there in a plane past age 60 you are more dangerous to yourself and society?

Mr. **Broderick**. Well, we would be happy to supply a copy of the report for the record, sir, if you would like.

We did do some analysis of—in following the NIA study. We published that report in 1983. And just recently I asked for some additional analysis of that data. And I was quite struck by the fact that, and as I said in testimony, I do not attribute conclusive evidence to this, but I was quite struck by the fact that between the ages of 60 and 70 the probability of a pilot that has a first- or second-class medical and has more than 5,000 hours of experience, which is quite a bit of flying time, the probability of that pilot being involved in a general aviation accident is some 2½ times greater than a pilot of the same qualifications aged 50 to 59. There is quite a striking difference in the data.

That represents not a sampling of data but, in fact, that is the accident data as measured by the National Transportation Safety Board over the period of 1976 to 1980, normalized by all of the flying time done by all of the pilots of that class in that same period of time, broken down by decade of age.

There is no question in our mind that that data, as I indicated, gives one cause for concern and caution if we are to change the age, whether we change it from 60 to 61, or 60 to 59, we are concerned that there may in fact be a nontrivial effect on safety.

General **YEAGER**. Is that the general aviation area, though, Mr. Broderick?

Mr. **BOEHLERT**. It's the—Yes.

Mr. **BRODERICK**. Yes. It is, in fact, a measure of general aviation accident rates. And I guess I would, I would say that we recognize that we cannot possibly get the same data for air carrier operations because we have no pilots in command of air carriers over the age of 60. But it is people who, some of whom may, in fact, be flying as second officers in airplanes who contribute to this data base. It is the same people using many, if not most, of the same skills.

Mr. **BOEHLERT**. Mr. Chairman, do we have for the record the test given to these people, all the requirements of the test?

The **CHAIRMAN**. No; we do not have it. But we are going to ask them to submit it. It is so ordered.

[See appendix 3, p. 155 for the "Guide For Aviation Medical Examiners" requested by Chairman Roybal.]

Mr. **BOEHLERT**. Because I am just wondering, Mr. Broderick, looking at page 4 of your statement, and you list several things that "relate to the loss of ability to perform highly skilled tasks rapidly,"—I understand how you can measure that—"to resist fatigue," well, that is somewhat questionable. But how do you measure an ability to "rapidly apply experience, judgment, and reasoning in new, changing, and emergency situations?" How is that measured?

Mr. **BRODERICK**. If we knew how to measure that, I can assure you that that would be one of the tests that we would want to give to all pilots. We do not know how to measure that.

Mr. **BOEHLERT**. That is the essence of the whole thing?

Mr. **BRODERICK**. That is correct.

Mr. **BOEHLERT**. OK. Thank you very much.

No further questions, Mr. Chairman.

The **CHAIRMAN**. Mr. Volkmer?

Mr. **VOLKMER**. I would just like to briefly ask, in the event that the Age 60 Rule were done away with and we relied on periodic examinations, assuming that we could come up with the examinations that we can rely on, would the FAA any longer would you propose, Dr. Williams, or Captain Shaver, or General Yeager, have any determination as to whether or not that pilot continued to fly? Or would the persons, the medical practitioners making the examination make that determination?

Dr. **WILLIAMS**. Well, the only, the only way I can reply, Mr. Volkmer, is that I believe that as I understand it now, the FAA relies in the medical proficiency area on medical testing. And I believe we can, with more recent knowledge, be more precise in that testing. And I believe we should continue to undertake to improve these tests.

Now, in the area of efficiency in flying, as Dr. Koonce testified to, there are the simulator skills. I would just simply add that in the National Institute on Aging regional panel report that is referred to, which was presented to Congress in August 1981, pages 22 to 25 contain a recommended approach to changing the Age 60 Rule, which recommends specific cardiovascular and/or flight proficiency tests and an approach that would allow identification of pilots at age 60 and beyond who measured up to all the criteria that would appear to be necessary to qualify as younger ages for continued flying.

So there is a recommendation on the record for an approach to change the Age 60 Rule.

Mr. VOLKMER. That still does not answer the question. Basically, who would make the final decision based on the recommended examination, the FAA or whoever is doing the examination?

Dr. WILLIAMS. I assume it is the FAA. The Chief Flight Surgeon makes the final decision. But he gets the information from the examiners.

Mr. VOLKMER. All right.

Dr. AUSTIN. He makes the decision based on the medical evidence. But there it is also the ability of the operator to perform it. He may be very medically fit, but if he cannot actually perform the task, which may not be due to medical reasons, then the check rides should be the determiner of it. And the airlines themselves have been using in-house check rides as well as those FAA checks and FAA observation flights and many other ways that they can actually measure the pilot's performance.

That is the bottomline: Can he do the task? And we can say that we get—they say, they accept it—that they can give check rides, they can assess the pilot's ability to exercise good judgment, decisionmaking, and do the tasks that are requisite for pilots, for captain of an airline, until he is age 60.

Mr. VOLKMER. I understand that.

Yes, Captain?

Mr. SHAVER. Sir; if I may respond to part of that. I would just like to tell you about a personal experience. We have heard about simulators. And I do not know how many of you have seen one operate or have been in one, but they are extremely realistic.

A United 747 simulator costs almost as much as an airplane, but it saves millions because they are not taking an airplane out of service to give us check rides.

When I was a 747 captain, on one occasion the first officer was doing his part of the flight testing. In other words, he was to fly by hand, using no auto pilot, an approach to 100 feet on three engines. And then when we would get to 100 feet there would be a truck on the runway or something would happen, we would have to go around. And this gentleman did such a lousy job, he did not correct for power being on one side and not as much on the other, and in this simulator we flipped over on our back and crashed. That was the last time that gentleman has ever flown for United Airlines. And he was in his very early 50's.

I think a simulator certainly can measure, certainly allow us to demonstrate whether we can respond to emergency situations, what our response time is, all that sort of thing.

Also, from the day we begin flying for an airline they keep pounding into us, don't do things too quickly. You keep hearing that old people move too slowly. Well, all of our training material says, here is an emergency, count to three before you do anything. If you move too quickly you will put out a fire in the wrong engine. They are talking to younger people, to people who start with the airline.

So speed of response is really not the crucial thing. And over many, many years we older pilots have experienced just about everything that can happen in an airplane.

I think that if you came and watched one of us in a simulator you would be astounded.

Mr. KOONCE. May I present some very recent research on response?

Mr. VOLKMER. Yes.

Mr. KOONCE. Response time.

This article was published and presented in the first week of October, at the Human Factor Society meeting. It is a report, research report by Braune, Wickens & Strayer. They did find a general slowing trend with age that appears to be more pronounced with complex stimulus material.

By the way, this increase in time from the 20- to 30-year-old group to the 50- to 60-year-old group is 153 milliseconds. That is slightly longer than one-tenth of a second. That does not mean an awful lot in flying. As you stated, count to three, that is about 150 milliseconds in the meantime.

Going on here.

> This results of this research,

I am quoting from it—

> Suggests that the slowing was most pronounced at the stages of response selection and execution, and that this slowing was in turn heavily related to conservative adjustment in the response criterion, with a corresponding shift towards more, than less, accurate performance. The data shows no loss in time sharing ability with age.

The author goes on to say—

> By the way, the younger pilots tended to respond faster but at a higher risk-taking level than the older subjects in this study.

And the authors go on to say—

> Although many of the age-related changes reported in the present research were highly reliable in a statistical sense, these results must also be put into the context of a large variability within the older age groups. This variability would suggest the danger of relying solely upon chronological age as a decision criteria. Instead, more emphasis should be placed on the notion of functional age and objective performance-based measures.

[The entire article Mr. Koonce quotes from follows:]

[From Proceedings of the Human Factors Society—29th Annual Meeting—1985]

AGE-DEPENDENT CHANGES IN INFORMATION PROCESSING ABILITIES BETWEEN 20 AND 60 YEARS

(ROLF BRAUNE, CHRISTOPHER D. WICKENS, DAVE STRAYER, AND ALAN F. STOKES, AVIATIIN RESEARCH LABORATORY—INSTITUTE OF AVIATION, UNIVERSITY OF ILLINOIS,—WILLARD AIRPORT, SAVOY, ILLINOIS)

ABSTRACT

Information processing performance in single- and dual-task configurations was examined across 60 subjects between the ages of 20 and 60. The objective was to investigate the general slowing trend observed with increasing chronological age more closely. The results supported this general slowing trend which appears to be more pronounced for complex stimulus materials. However, age did not interact with dual-task loading. Examination of the evoked brain potential data under speed and accuracy instructions suggested that most of the slowing was attributed to response processes rather than those of perception and memory. Futhermore, older subjects were more conservative in placing their response criterion and suffered a smaller loss when placed under speed stress.

INTRODUCTION

An increase in chronological age is usually equated with a general slowing in information processing speed and a reduced capacity. Also, age-related decrements in dual-task or time-sharing performance are frequently reported (e.g., Birren and Schaie, 1977; Poon, 1980; Hunt and Hertzog, 1981; Salthouse, 1982). The evidence for age-related changes in processing latency is relatively well established suggesting a general slowing in perception, central processing, and responding. The data with regard to attention or capacity effects of aging are less clear cut. For example, Hunt and Herzog (1981) summarize literature supporting what is referred to as the "attention deficit hypothesis". This hypothesis states that tasks that demand more attention and are more complex (e.g., dual-task or time-sharing tests) will show larger age-related decrements than relatively simple tasks (e.g., single task reaction time tasks). Hunt and Hertzog (1981) report a study in which subjects from ages 20 to 41+ performed a reaction time task alone and concurrently with an easy and difficult memory task. Dual-task decrements increased significantly above age 40. However, Hunt and Hertzog also found that the age-related decrement was actually smaller for the more difficult memory task. Salthouse (1982) suggests that some caution should be exercised in accepting the attention deficit hypothesis.

The data reported here are a part of a larger project that developed a battery or human information processing tasks to examine the effects of aging on pilot performance. The details of this project are described in Wickens, Braune, Stokes, and Strayer (1985) and Braune and Wickens (1983; 1984). A subset of the results from two experiments are reported. In Experiment 1 the focus is on a series of information processing tasks performed under both single and dual-task conditions. The single- and dual-task results of the various Sternberg task versions and a second-order compensatory tracking task are reported. The general robustness of the slowing in information processing is emphasized as well as the absence of age-related decrements in time-sharing performance. In Experiment 2 the emphasis is on a more fine grained analysis of the slowing effects in reaction time, employing the P300 component of the event related brain potential as an index of slowing of perceptual speed (McCarthy & Donchin, 1981), and the speed-accuracy tradeoff function (SATO) in conjunction with the Sternberg.

METHOD

Subjects

Sixty male subjects between the ages of 20 and 60 participated in both experiments. For the purpose of statistical analysis the subjects were separated into four age groups: Group 1 (G1) 20–26; Group 2 (G2) 27–39; Group 3 (G3) 40–52; and Group 4 (G4) 53–60. Each group had 15 subjects. The subjects were all volunteers that had responded to ads in local newspapers. All reported to be in good health with 20/20 corrected vision and normal hearing. Each subject was paid for his participation. The same subjects particiapted in Experiment 1 and 2.

Tasks

A total of 9 different information processing tasks combined into 13 single- and dual-task configurations made up the informaiton processing test battery used in Experiment 1. Only those tasks for which the results will be reported are described in more detail:

Visual-verbal Strenberg task (VV)

Prior to each trial the subject was presented a memory set of either 2 or 3 randomly chosen letters. Each letter was presented for 3 seconds for two cycles. Following this presentation, a series of probe letters was presented of which 50% were drawn from the memory set. Using a two button control switch, the subjects indicated whether each stimulus was or was not a member of the memory set. Correct response times for "yeas" and "no" responses were averaged and the proportion of correct responses recorded.

Auditory-verbal Sternberg (A V)

This task was identical in format to the VV task except that the stimuli were presented auditorily over headphones. During initial presentation the 3 letter memory set was repeated twice.

Visual-spatial Sternberg (VS)

This task was analogous to the VV version, except that the "alphabet" from which the stimuli were drawn was constructed of line segments formed by connecting pairs of points in a 2(row) × 3(column) matrix. A set size of 3 was used.

Second-order tracking

The subjects manipulated a spring-loaded control stick in the left-right direction with the right hand in order to minimize the error on a horizontal compensatory display. Control was exercised using second order (acceleration) dynamics. When presented concurrently with the visual Sternberg tasks, the tracking error was displayed immediately above the Sternberg stimulus. In this case, the response to the Sternberg task was effected with the left hand. For all dual task combinations, subjects were told to give equal emphasis to both tasks.

For Experiment 2 the spatial and verbal Sternberg tasks that were employed were identical to those used in Experiment 1. Three bias conditions were included. The neutral condition emphasized both speed and accuracy. The speed condition emphasized speeded responses and the accuracy condition emphasized a accurate responses. Memory set sizes of 2, 3, and 4 were used.

Apparatus

Experiment 1 was performed at the Engineering Psychology Research Laboratory of the University of Illinois. A PDP 11/40 minicomputer was used to generate the stimuli and record the subjects' performance. The computer was interfaced with a Hewlett-Packard display generator, a control stick, and inerchangeable keyboards. Auditory stimuli were generated by a Centegram Corporation Mike-2 Unit, interfaced to the PDP 11/40. The subjects sat in a sound and light attenuated booth approximately 90 cm from the CRT. Throughout the entire experiment subjects and experimenter communicated by intercom operating through headsets.

Experiment 2 was conducted at the Cognitive Psychophysiology Laboratory of the University of Illinois. Stimulus presentation and data acquisition were governed by a PDP 11/40 computer. The visual stimuli were presented on a similar Hewlett-Packard CRT that was used in Experiment 1. The display was positioned 75 cm from the subjects. The EEG and EOG were amplified with Van Gogh Model 50000 amplifiers.

Procedure

In Experiment 1 each subject was administered the complete test battery four times, once for a brief familiarization period and three times as Sessions 1, 2, and 3. The familiarization period took the form of a 1-minute run immediately preceding each task in Session 1. In Sessions 1, 2, and 3 each task took the form of a 2-minute trial in which response data were recorded. The duration of each complete administration was 3.5 hours including two 10-minute intersession breaks.

In Experiment 2 all subjects were run through all 3 bias conditions. The slowest changing experimental variable was the stimulus code (spatial vs. verbal), the order of which was counter-balanced across all subjects. All three bias conditions were run within one stimulus code before changing to the other code. The neutral instructions were always the first bias instructions given. The order of the speed and accuracy instructions was counter-balanced across subjects. Fifty percent of the trials were positive responses and 50% were negative. EEG activity was recorded from Fz, Cz, and Pz electrodes (Jasper, 1958), and was stored on magnetic tape for subsequent analysis. EOG activity was corrected offline (Gratton, Coles, and Donchin, 1983B). The latency of the P300 component was assessed by identifying the largest positivity in the parietal electrode within a 300-800 msec window.

RESULTS

The reported results represent a subset of the data obained in the Wickens, Braune, Stokes, and Strayer (1985) investigation. The focus here is on the second-order compensatory tracking task and the different versions of the Sternberg task in single- and dual-task configuration.

Braune and Wickens (1983) had reported that many of the tasks in the test battery showed practice effects across the two experimental sessions and that performance appeared to be more stable in the second session. To obtain a better reliability estimate three sessions were run in the Wickens, et al. (1985) investigation. The intersession correlations showed an average of 0.83 between Sessions 1 and 3 and .86 between Sessions 2 and 3. As Session showed no interaction effects with the other variables the data were collapsed across Session 2 and 3 to obtain a more stable performance estimate. Figure 1 presents a graph of mean correct reaction times for each Sternberg modality plotted against Age Group.

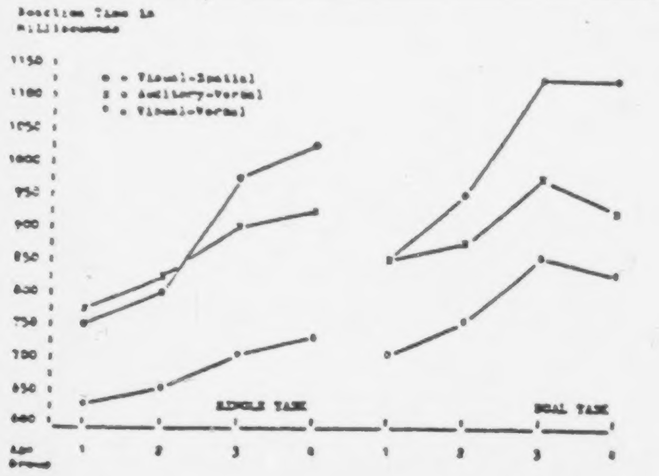

Figure 1: Mean Sternberg reaction time plotted against age group.

Response time increased systematically with age (F=10.74, $p<.001$). Latency was most rapid in the Visual-Verbal condition, intermediate in the Auditory-Verbal condition, and slowest in the Visual-Spatial condition. These effects were tested in two ANOVAs, one employing the two verbal conditions (VV & AV) condition (F=119.13, $p<.001$) and a second employing the two visual conditions (VS & VV) (F=107.59, $p<.001$). In the dual-task conditions subjects repeated all three Sternberg tasks while at the same time performing the second-order compensatory tracking task. Response times in the dual-task condition shown in the right portion of Figure 1 were significantly slower than in the single-task conditions (F=25.34, $p<.001$). No evidence of any interaction of task load with Sternberg modality was found. Age Group did not interact with dual task loading, nor were these two factors involved in any higher-order interactions. In this respect, the results replicate the findings reported by Braune and Wickens (1983) presenting no evidence that time sharing efficiency deteriorates with age between 20 and 60 years.

The results from the second-order compensatory tracking task showed a similar pattern to those of the Sternberg task. Age Group had a significant effect upon tracking performance (F=18.14, $p<.001$). However, Sternberg modality showed no significant interaction effects with age though the main effect of task load (single vs. dual) was reliable (F=25.34, $p<.001$). This again suggests the absence of any age-related time-sharing decrement.

Further support for the absence of a time-sharing decrement due to age was provided by a factor analysis. This analysis focused directly on those measures felt to be relevant to time-sharing. It included "Age" as a variable, the dichotic listening attention measures, all of the dual-task decrements scores (i.e., single subtracted from dual), and spatial tasks. The analysis showed the dichotic listening task measures to define the first factor, heavily influenced by age. The second factor defined tracking skill, while the third factor loaded on the visual-spatial time-sharing decrement along with the hidden figures measures. The fourth factor was defined by the three time-sharing decrements in reaction time. Significantly, this factor did not vary with age, reinforcing the independence of time-sharing ability and age across the age-range under consideration. Factor 5 was directly relevant to spatial ability.

In Experiment 2 certain expected effects were obtained. There was a generally linear effect of memory set-aside on reaction time (F2, 12=284, $p<.001$). Reaction time was longer for the spatial than the verbal stimuli (F1, 56=106, $p<.001$), and the effect of set size was greater for the spatial stimuli (F2, 112=25.4, $p<.001$). The effects of the speed-accuracy manipulations on both latency and error rate were monotonic and in the expected direction (Reaction time: (F2, 112=6.03, $p<.001$); Accuracy: (F=22.8, $p<.001$)).

The effect of age on reaction time generally replicated those found in Experiment 1 whereby the effect of age was greater for the spatial than the verbal stimuli (F3, 56=2.93, $p=.04$). The effect of speed-accuracy instructions on reaction time were equivalent for the four age groups. However, the effect of instructions on error rate was different. While performance generally became more accurate as age increased (F=2.88, $p=.04$), the main source of this improvement occurred in the speed condition (group x bias interaction: F,112=2.76, $p<.02$). That is, imposing speed stress led to a larger cost in accuracy for Group 1, a smaller cost for Group 2, and a minimal cost for Groups 3 and 4. Figure 2 shows a cross-plot of accuracy against reaction time for the four age groups in a speed-accuracy space. Rapid and accurate (good) performance is shown to the upper left and poor performance (slow and inaccurate) to the lower right. The shift in performance resulting from speed stress is shown by a movement toward the lower left.

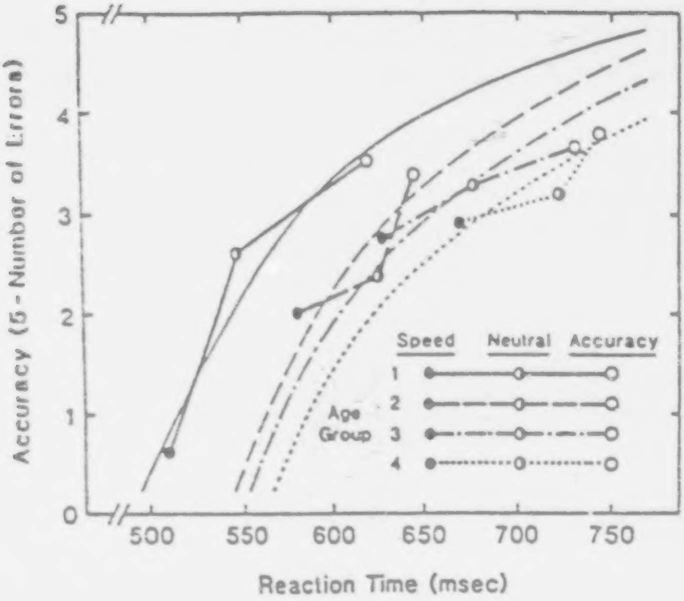

Figure 2: Effect of speed-accuracy bias instructions on accuracy and reaction time as plotted by the speed-accuracy tradeoff (SATO). The three instructional sets for each age group are connected by straight lines. The smooth function fits through the three points and indicates the difference between groups in overall proficiency.

All four age grops show a shift in the appropriate direction with speed stress (towards the lower left). A major cause of the faster performance shown by the younger group appears to result from the fact that they are operating less conservatively, closer to the point where large losses in accuracy occur. In contrast, the older groups are responding initially at a more conservative level, farther out along the asymptote. With this greater margin for increasing speed, they are less likely to sacrifice accuracy.

The effects of the Sternberg manipulations on P300 latency indicated a significant increase with set size (F2, $p12=89$, $>.001$). There was no main effect of stimulus code. Figure 3 shows the effect of age on the mean P300 latency averaged across all other variables. Similar to the reaction time data, a monotonic and marginally significant increase in latency from the youngest to the oldest group (F3, $56=2.17$, p. 10). The reaction time data are also plotted so it is possible to see that the total increase in P300 latency from the youngest to the oldest age group is only 50 msec as compared to 153 msec change in reaction time accounted for by age. This indicates that the greatest age-related slowing occurs in the post-perceptual process.

Finally, the effect of speed-accuracy set on P300 latency while significant (F2, $112=5.89$, $p>.01$) was non-montonic. Shortest latency (594 msec) was obtained in the neutral condition, while longer and equal latencies were observed in both the speed and accuracy conditions (602 and 603 msec). This finding appears to confirm the conclusion that speed stress instructions were accommodated by shifts in response criteria rather than encoding or memory search time. The absence of an age x bias interaction in P300 latency is also consistent with the previous argument that response processes were primarily responsible for the age differences in speed-accuracy set shown in Figure 2.

DISCUSSION

A primary purpose of the two investigations was to examine the general effects of aging on human information processing skills. The general age-related effects revealed two primary findings: (1) The data revealed a slowing in information processing speed at all stages of processing replicating conclusions offered by Salthouse (1982). The present data suggest that the slowing was most pronounced at the stages of response selection and execution, and that this slowing was in turn heavily related to a conservative adjustment in response criterion with a corresponding shift towards more rather than less accurate performance. (2) The data suggested no loss in time-sharing ability with age.

Although many of the age-related changes reported in the present research were highly reliable in a statistical sense, these results must also be put in the context of the large variability within the older age groups. This variability would suggest the danger of relying solely upon chronological age as a decision criterion. Instead more emphasis should be placed on the notion of functional age and objective performance-based measures.

ACKNOWLEDGEMENTS

This research was supported by Contrast N00014-83-K-0747 from the Naval Aerospace Medical Research Laboratory, Pensacola, Florida. CDR Dr. Jerry M. Owens was the technical monitor. We are indebted to Roger Marsh and Doug Heuer who carried out the programming for Experiment 1.

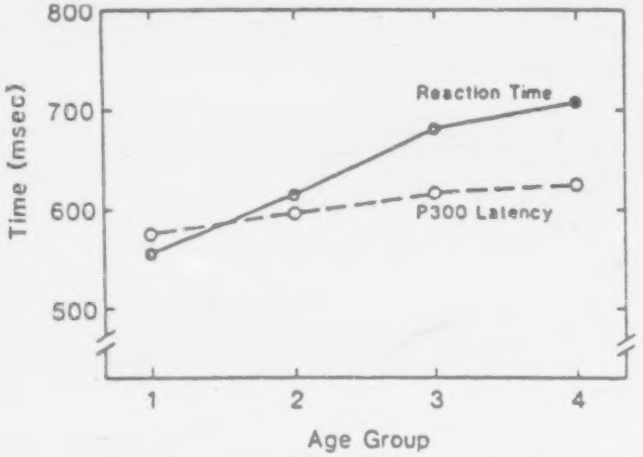

Figure 3: Effect of age on mean P300 latency and on reaction time. The figure shows the greater age effect on RT than on P300.

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Mr. VOLKMER. Thank you, sir.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you.

Mrs. Bentley?

Mrs. BENTLEY. Thank you, Mr. Chairman.

Captain Shaver, I am a member of the AARP.

Mr. SHAVER. Well, good. At least two of us are here today.

Mrs. BENTLEY. I am also a member of the Committee on Public Works and Transportation, so I am very interested in the regulations and the safety, of course, of flying and for all the modes of transportation, but particularly in the airline, inasmuch as that is the one, I would say, that most of us in business, in Congress, et cetera, are using today, and actually, all over the country, for people to get back and forth.

Going way back when I was covering the national transportation picture for the "Baltimore Sun", I got to know the traffic controllers very well. And they are required to retire at age 56, I believe. In justifying this limit a House committee said that that there is no allowable margin of error in the control of air traffic. Physical well-being and peak effectiveness on the part of the controller is of utmost importance in the safety of the people who travel by air. There is no room for compromise.

Now, isn't the air traffic controller situation at least somewhat analogous to that of an airline pilot?

Mr. SHAVER. I would say only very slightly. And, you know, very sincerely, I must say traffic controllers under some circumstances are under far greater pressure than we are.

All of you have ridden into Chicago's O'Hare Field. And when things are routine, the weather is stable, whatever the weather is, just if it is not changing they have a wonderful pattern setup, they do a fantastic job. But let's say that they are using two runways for landing and two for takeoff. They have got airplanes coming from every direction.

But then a front goes through and the wind changes direction 180 degrees. What do you do with all these airplanes that are headed in for runways which now are the wrong ones? They are under tremendous pressure. I do not know how they handle it under those circumstances, but they do do a magnificent job. And if I did that kind of work I think I would be ready to retire before 56, and I would probably have ulcers.

My hat is off to them; they do a wonderful job. But we are not under that sort of pressure. The nearest thing to it, the other side of it, let's say that I am the captain, I am coming into O'Hare Field and this happens, I am told to go into a holding pattern perhaps at 37,000 feet—and this may sound complicated—but all I have to worry about is all of the airplanes in that one holding stack because I want to be sure that that controller does not say the wrong number.

Let's say United 100 is in the stack, American 100, TWA 100 and Alitalia 100, the traffic control under pressure says, "American 100, you are cleared from an approach," and he is the top one in the stack. Well, he wants to know. I mean, he knows the rest of us are under him. But each of us memorizes who is above us, who is below us, so that if the traffic controller makes a misstatement nothing happens.

Now that, that is the most pressure I am under under that situation. But those people on the ground have holding patterns all over the place, airplanes that were starting an approach have to pull up, make a different one. So I would say that the level of pressure is just nowhere near the same.

Mrs. BENTLEY. You made a comment in your discussion that you would be ready to retire before age 56 if you were a traffic controller. Is 56 a fair age for the retirement of traffic controllers, in your opinion?

Mr. SHAVER. Well, I think that would really be an individual thing. Some people can handle stress better than others. But I think they should be allowed to retire fairly young if they are developing ulcers, they cannot sleep at night, and that sort of thing. And I know some of them wake up with nightmares because they have missed hearing an airplane call or they have misidentified one. I mean, they are concerned with many, many aircraft. We are concerned with one. And we monitor what they do very, very carefully and take self-protective action, let's say, but we still are not nearly as involved as they are, not under near the pressure.

Mrs. BENTLEY. I know that at one time they were trying to get age 50, I think, as their retirement because of the pressures. Do you think that there that we ought to eliminate any air—I mean age maximum?

Mr. SHAVER. Well, I certainly would eliminate it. But I would give them the option.

You know, I am a great believer, like I think our Government is nowadays, in free choice, in free enterprise, and so on, and I would like to see it so that someone who does not feel able, does not want to fly, does not want to be a traffic controller past age 45, hates the job, that it would be economically possible for them to retire. But someone like myself who is 64 next week, ready, willing and able, and thoroughly enjoys the job, should keep on flying. Let the other fellow who does not like it, who can no longer meet the standard, retire. I mean, why treat us, why make us all do exactly the same thing.

Mrs. BENTLEY. What you are sort of saying, in essence, is that as science and medical knowledge progress that we must continue to examine our regulations and adjust accordingly?

Mr. **Shaver**. Yes, I certainly do. Why not take advantage of all the developments?

Mrs. **Bentley**. Thank you, sir.

Thank you, Mr. Chairman.

The **Chairman**. Thank you, Mrs. Bentley.

Gentlemen, this has been an excellent hearing. May I point to the fact that the House of Representatives has been most cooperative. We have not had a rollcall, quorum call, nor anything for the last, well, almost 2 hours now. So the cooperation has come from all sides.

Again, I say the hearing has been excellent. We are still somewhat confused over some of the issues involved. I, for example, still cannot understand why a policy that would terminate an experienced pilot at 60 can at the same time recertify others that are under 60 who have a long history of alcoholism and other serious conditions. I see about nine pages here of other exemptions granted. Some pilots have suffered intercranial hemorrhages. In one particular instance a recovering alcoholic was recertified and later committed suicide. We have personality disorders, hypertension, diabetes. Some of the recovered alcoholics resumed drinking and were again recertified. There are psychiatric problems, and on and on. These are some of the things that are worrisome.

[See appendix 4, p. 306 for list of exemptions referred to by Chairman Roybal.]

Now, Congressman Rinaldo made a unanimous request earlier in the hearing. I would like to ask that he restate the request and clarify it. It has already been adopted, but we will go through the motions of adopting his unanimous request that we do the following. Congressman Rinaldo will now explain.

Mr. **Rinaldo**. Thank you, Mr. Chairman.

Mr. Chairman, first of all, I certainly want to thank our panelists. I think they have been very illuminating. And I am certain that every member of this committee has learned a considerable amount from what took place.

However, I also think you very properly pointed out that we went through this exercise once before and the committee never received any kind of test on which to base any possible change in the current method of using an arbitrary age factor.

So I would like to once again specifically request unanimous consent that Dr. Williams, Dr. Koonce, and Dr. Fox, either collectively or independently, have 30 days to send us the tests that would properly measure a pilot's ability to perform over age 60, and which would serve as a safe, reliable and accurate substitute to the age 60 rule, and also provide at least the same degree of safety to the flying public.

Now, do we have the assurance of you gentlemen that the committee will receive this?

Dr. **Williams**. Yes, you can.

The **Chairman**. All right. Without objection, that request is adopted.

May I follow that by asking Dr. Frank Austin, after we receive that report, will you review the report, study it, and then meet with the committee to give us your findings with regard to the report?

Dr. **Austin**. Yes, sir.

The **Chairman**. All right. Is it then possible after the medical profession has met on the particular report, for the FAA to meet with doctors on both sides, discuss the report, and then perhaps reach some kind of conclusion with regard to one test? Is that a possibility?

Mr. **Broderick**. We would be happy to gather the people together and see if such a consensus conclusion is possible.

The **Chairman**. That is why I used the words, is that a possibility.

What we are doing then, we will get, first, a report from the three doctors; second, Dr. Austin will review that report, and then meet with the committee immediately thereafter; and third, have the doctors in question meet with the FAA to see if you can reach some agreement with regard to one specific examination that can be given to pilots. That will then show that the age 60 rule is a rule of administrative convenience that was established strictly for the convenience of administration. From previous meetings we have held, I know that to be a fact.

And if we are all in agreement I think we have accomplished a great deal today. I wish to thank each of the witnesses, and hope that in 30 days we will see each other again. We must privately work very hard to try to settle this once and for all.

We have had three hearings on this matter, let's not have another one. Let's have some action.

The meeting is now adjourned.

[Whereupon, at 12:50 p.m., the hearing was adjourned.]

APPENDIX 1

DEPARTMENT OF HEALTH & HUMAN SERVICES
Public Health Service

National Institutes of Health
Bethesda, Maryland ~~20205~~ 20892
Building : 31
Room : 2C02
(301) 496-9265

December 19, 1985

The Honorable Edward R. Roybal
Chairman
House Select Committee on Aging
House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

During the hearing on airline pilot retirement held by the Select Committee on October 17, it was agreed that Dr. Samuel N. Fox, III, Dr. Jefferson M. Koonce, and I would develop an examination protocol which might substitute for the Federal Aviation Administration's (FAA) Age 60 rule.

The attached protocol is our combined response to that request. It is based on the Report of the National Institute on Aging (NIA) Panel on the Experienced Pilots Study and subsequent additional research related to human performance beyond age 60, as presented at the hearing on October 17. The proposed protocol would provide for testing commercial airline pilots for continuation of pilot status beyond age 60.

While the Report of the NIA Panel on the Experienced Pilots Study of August 1981 concluded that, despite no convincing medical evidence for pilot retirement at age 60, the present rule should stand because of inadequate data to support a change, it also recommended that, "an approach to changing the age 60 rule," should be undertaken (pp. 22-25 of that report). In the intervening years since 1981, further research has documented the maintenance of good health and functioning in many persons well beyond the age of 60, and has documented the predictive value of certain tests.

Drs. Fox, Koonce, and I have based the enclosed protocol on the previous recommendation and the more recent research findings, and are submitting it for discussion and comment by the FAA as requested by you and Mr. Rinaldo of your Committee.

Sincerely yours,

T Franklin Williams

T. Franklin Williams, M.D.
Director
National Institute on Aging

Enclosure

December 19, 1985

] Proposed Examination Protocol for Airline Pilots Age 60 and Above [

This proposed protocol is designed to provide, for any pilot affected by the present age 60 rule who wishes to continue as a pilot beyond age 59, a comprehensive examination of health status and performance ability which should establish his/her continued qualification. The protocol may provide the additional benefit of creating data that can subsequently be used as a basis for further modification of rules regarding such pilots.

Any pilot subject to the age 60 rule who wishes to continue as a pilot beyond age 59 would undergo the following comprehensive medical evaluation and evaluation of performance.

The medical evaluation protocol should include the following initially and at least annually thereafter:

(1) Medical and interim history including smoking history

(2) Physical examination including funduscopic

(3) Blood pressure

(4) Chemical screen profile -- SMAC-24 or comparable blood chemistry tests including total and high-density lipoprotein cholesterol and triglycerides

(5) Urinalysis

(6) Chest X-ray

(7) Resting electrocardiogram -- standard 12-lead

(8) Exercise Tolerance Test (ETT) including thallium perfusion study

The present qualifying criteria would apply for those test components already included in pilot examinations. The examining physician and the reviewing physician of the FAA should exercise judgment with regard to the additional risk factors included above, i.e., smoking history, and blood lipids.

The Exercise Tolerance Test should be performed on a motor driven bicycle ergometer, or treadmill with little and preferably no use of handrails, both accurately calibrated, with accompanying thallium perfusion scans. X-ray type reproductions of the thallium scans should be submitted to the FAA which in turn would have them reviewed by a recognized expert in their interpretation. The examinee would be considered to have obtained "clearance" on this medical evaluation if he/she can demonstrate an uncompromised capability to complete a progressive exercise protocol achieving at least a total body metabolic intensity of ten (10) multiples of resting rate (METs) over a period of no less than ten (10) minutes with at least three minutes above seven (7) METs. This can be achieved by completing nine minutes of a Standard Bruce Protocol. An eight (8) MET criterion appears appropriate for women. In addition the thallium scan interpretation should be clear of defects, except that a defect seen on the immediate post-exercise film which persists unchanged in a post-three-hour film may, based on the physician's judgment, not be considered disqualifying.

Compromising responses on the ETT would be the occurrence of any of the following:

1. More than -0.10 millivolts horizontal or downsloping ST segment depression (or equivalent elevation) in any precordial lead or Leads I or aVL during or after exercise or more than -0.15 mV in lead aVF. Some correction for R wave amplitude may be appropriate where R waves exceed 2.0 mV in height.

2. Occurrence of three or more sequential premature atrial or ventricular complexes during exercise.

3. Decline of more than 20 mm Hg of systolic pressure with continued exercise beyond the initial adjustment to the test protocol.

4. Less than coherent verbal responses, staggering, ataxia or other evidence of intolerance to the exertional demands.

5. Chest discomfort or any form of "anginal equivalent."

The comprehensive flight proficiency protocol, should consist of the following components:

1. Written test of knowledge.

   The pilots should be given an annual written test on their knowledge of their aircraft's systems, the procedures specific to the aircraft itself, and the applicable information from the Federal Aviation Regulations and the Airman's Information Manual. This will serve as a check on the retention of the cognitive and procedural information which tends to deteriorate over time, especially if the pilot reviews and/or uses this information infrequently. The test materials relating to the Federal Aviation Regulations and the Airman's Information Manual should be written by the FAA and focus on the areas specified in FAR 121.419(a). The FAA already has a significant battery of test items on subject matter in these domains and would be best suited to develop tests measuring the extent to which pilots have a satisfactory knowledge of the regulations and procedures related to aircraft operations in the airspace system. Tests on the pilots' knowledge of their aircraft's systems and procedures would best be developed by the manufacturers of the aircraft across all airlines who use that equipment. But since this is highly unlikely, the individual airlines should develop such tests, and those tests should be approved by the Administrator.

2. Perceptual-motor skills of piloting.

   The perceptual-motor skills of piloting the aircraft should be checked twice each year (at least once every six months) to ensure the ability of the pilots to perform the tasks required of their flightcrew positions. One should utilize the computer-based flight simulator systems, presently used by the industry for initial checkout and upgrade training and line oriented flight training (LOFT), to measure the proficiency or skill of the pilots. The FAA specifies the maneuvers and procedures that should be performed in a proficiency check ride (Appendix F or Part 121) and has set tolerances for performance on flight parameters in the Advisory Circular AC61-77, Airline Transport Pilot Airplane Practical Test Guide. The flight simulators can be rather easily programmed to monitor the pilot's ability to maintain the flight parameters of the aircraft within the tolerances set forth by the FAA. The current modern simulators in use are controlled by computers, and specific parameters, such as airspeed, altitude, course deviation, deviation from flight paths, rates of ascent or descent, and other information regarding flight controls and parameters, can be monitored by the computer and information produced indicating the frequency and magnitude of any deviations from the desired parameters. This would provide for the determination of skill level (proficiency) in the most objective manner possible at the time.

3. Application of rules and procedures.

   Procedural items are to be evaluated in terms of the satisfactory completion of the appropriate sequence of steps (as per the approved airplane operating manual) in a timely manner. This should also be done at least once every six months. The specific steps of the procedures are set forth in the manuals and could be programmed into the computer that would check for the appropriateness of responses. The timeliness of the pilot's behaviors should be determined by the recommendations of the manufacturer of the equipment based upon the maximum reasonable time that would prevent further aggravation of the abnormal situation. For flight skills and procedures which must be performed in the actual aircraft, relatively objective manually scored checklists can be developed which will reflect the magnitude of deviations from physical parameters, correctness of procedures, and the extent of proper management of cockpit resources on hand.

It is recommended that a flight simulator as per Appendix H of Part 121 of the FAR be utilized for the measurement of performance to the greatest extent possible. The actual maneuvers and procedures included in the proficiency flight checks should include, but not be limited to, those set forth in Appendix F of Title 14 CFR, Chapter 1, Part 121.

The criteria for judging performances should be based upon the effects of the pilot's behaviors upon safety of flight and the flight test standards published by the FAA.

References for the flight proficiency protocol:

FAR Part 121.415	Crewmember and dispatcher training requirements.
121.417	Crewmember emergency training.
121.419	Pilots and flight engineers: Initial, transition, and upgrade ground training.
121.424	Pilots: Initial, transition, and upgrade flight training.
121.427	Recurrent training.
121.433	Training Required.
121.434	Operating experience.
121.437	Pilot qualification: Certificates required.
121.439	Pilot qualification: Recent experience.
121.440	Line checks.
121.441	Proficiency checks.
121.443	Pilot in command qualifications: Route and airports.

Appendix E of Title 14 CFR Part 121, Subpart W - Flight Training Requirements. Maneuvers and procedures required by Section 121.424 to be performed in flight except to the extent that certain maneuvers and procedures may be performed in an airplane simulator with a visual system (visual simulator), an airplane simulator without a visual system (nonvisual simulator), a training device, or a static airplane as permitted by Appendix E.

Appendix F of Title 14 CFR Ch. 1 Pt. 121, Subpart W - Proficiency Check Requirements. Specifies the maneuvers and procedures required by Section 121.441 of 14 CFR Ch. 1, Subchapter G, Part 121, Subpart N.

AC61-77 Airline Transport Pilot Airplane Practical Test Guide. Designed to assist the applicant and his instructor in preparation for the Airline Transport Pilot Certificate with an Airplane Rating under FAR Part 61 (revised).

AC120-36A Line-Oriented Flight Training Programs. Sets forth one means, not the only means, acceptable to the Administrator for approval of a line-oriented training program under FAR 121.409.

AC120-40 Airplane Simulator and Visual System Evaluation. Sets forth one means that would be acceptable to the Administrator for the evaluation of airplane simulators to be used in training programs or for airmen checking under Title 14 Code of Federal Regulations (CFR). See FAR Part 121 Appendix H - Advanced Simulation Plan.

Evaluation methodologies relevant to pilots' health and proficiency are continuing to be developed. For example, the Single Photon Emission Computer Tomographic (SPECT) approach, now becoming more widely available, may enhance the capabilities of thallium imaging; radionuclide angiography may also provide useful information, but performance standards for persons aged 60 and over need further definition. More quantitative predictive values for risk factors such as those referred to above should also become available. The FAA should assure that it is kept adequately informed of progress in such development and, together with ongoing analysis of the results and outcomes of the above tests, should modify its requirements from time to time.

In addition, a program should be developed to collect data on a random selection of pilots between the ages of 40 through 55 for normative purposes. These data could also be utilized for longitudinal documentation of the individual changes in piloting abilities over time.

EDWARD R. ROYBAL, CALIFORNIA
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PAUL SCHLEGEL
MINORITY STAFF DIRECTOR

November 25, 1985

Dr. Robert Elliot
629 27th Street
Manhattan Beach, CA 90266

Dear Dr. Elliot:

Since the enclosed letters from Dr. Charles Billings and Dr. Don Flinn contradict certain testimony we received during the Committee's hearing of October 17, 1985, I would appreciate your comments on their contents.

Thank you for your assistance.

Sincerely,

Roger Thomas

Roger Thomas
General Counsel

ROBERT W. ELLIOTT, PH.D.
CLINICAL PSYCHOLOGIST
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December 10, 1985

Roger Thomas
U.S. House of Representatives
Select Committee on Aging
Washington, D.C. 20515

Dear Mr. Thomas:

This is in reply to your letter of November 25, 1985 in which you asked me to comment upon the content in letters from Dr. Charles Billings and Dr. Donald Flinn regarding the FAA mandatory age 60 retirement rule for commerical pilots.

Dr. Billings comments that "...some of the skills necessary for flight crew performance deteriorate with advancing age..." in a more subtle than gross manner affecting the "...highest intellectual skills." While it is true that there are neuropsychological changes which accompany the aging process, there are greater differences between individuals of the same age group. Some individual's skills decline, others maintain their skills, and a few even improve in selected skill areas. Dr. Zaven Khachaturian, of the National Institute on Aging, estimates that approximately 10% of the elderly population show clinically significant cognitive deficits (American Psychologist, November, 1985, p. 1251). The same 10% figure was quoted in the article, "Senility Reconsidered", in the Journal of the American Medical Association. The issue with the pilot group is not whether there is a decline in skills for the group as a whole, but rather, are we capable of identifying individual pilots who have loss the capability to safely and proficiently operate complex aircraft. If "decline" in the pilot population were the only issue, then we would have to address the issue of decline beginning at about the age of 25 years. It is at about this age that measureable loss of selected skills begin to take place.

Dr. Billings notes that the "...predictive indices suffer from a progressive decrease in discriminatory power with advancing age...", so we would be unable to measure performance capability in "...novel or critical situations." In neuropsychology very significant advances have been made during the last 10 years. Neuropsychological measures, in the hands of trained and competent examiners, can yield reliable and valid data with correlations with neurophysiological and neuroimaging results in the .90s. Subtle intellectual deficits can be identified with existing measures. A long list of some existing measures was offered in Elliott's (1985) paper, Aging Effects and the Professional Pilot. Aged normed data are available for many of the tests. Many of the measures have been used with young military pilots and with older, intellectually bright, members of the general population. There is no published data on validation studies with older commerical pilots.

Chronological age alone tells us very little about the status of an individual's brain and brain functions. Any performance test measures functional skills at a single moment. This is true for medicine as well as for neuropsychology or flight performance (check rides) measures. With longitudinal measures on performance tests, the predictive power of any test increases and may suggest a trend. This would hold true for the 25 year old as much as it would for the 60 year old.

Dr. Flinn notes that no index of "psycnomotor functioning" exists at this time because there has been no formula established for combining the functions of perception, intelligence, and psychomotor and psychophysiological skill levels into a "physiological index" of aging. While no physiological index of aging has been established, there has never been a need to establish such a single index. Many different factors contribute to flight performance. Each of these factors has a different level of importance in the overall operation of modern-day aircraft. Many, if not most, of the functions associated with the complex tasks involved in decision making in piloting a commerical aircraft have been identified and have been published. A review of different human factors related to flight safety and successful piloting were listed in the FAA publication, Psychophysiological Effects of Aging--Developing a Functional Age Index for Pilots: II. Taxonomy of Psychological Factors (April, 1978). By collasping 135 identified factors involved in operation of aircraft, 12 common factors were generated. Those major factors were as follows:

1. Perception
2. Attention
3. Reaction
4. Orientation
5. Sensorimotor
6. Stamina
7. Cognition/Mentation
8. Experience
9. Interpersonal Relations
10. Personality
11. Learning
12. Decision Making

Reliable and valid measures which can evaluate each of these common factors are available and widely published. Age and education norms are available for many of these measures.

In summary, while it is recognized that there are declines in some skill areas accompanying increasing age, the decline is not apparent in all skill areas and not every individual undergos a decline. When significant decline exists in an individual, that decline can be identified with existing measures, even if the loss is subtle. A "physiological index" of aging is not needed. What is needed is a valid and reliable means by which pilot capability levels can be assessed. Such assessment technology currently exists. If every commerical pilot over the age of 60 years were neuropsychologically assessed every six months even slight changes in functional performance levels could be identified, monitored, and the etiology investigated. There is no valid reason why a well trained, mentally alert, and physically intact commerical pilot should not be able to continue as a pilot into his or her sixities.

Robert W Elliott

Robert W. Elliott, Ph.D.
Diplomate in Clinical Neuropsychology,
American Board of Professional Psychology

RE/tl

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December 3, 1985

Mr. Roger Thomas
General Counsel
U.S. House of Representatives
Select Committee on Aging
Washington, DC 20515

Dear Mr. Thomas:

Im reply to your letter of November 25, enclosed are my comments on Dr. Charles Billings' letter of November 12 and that of Dr. Don Flinn of the same date, both to Mr. Rinaldo.

The Select Committee on Aging is to be congratulated on conducting the very important hearing on October 17, 1985, clearly documenting the modern-day lack of any basis for an "age 60" rule on pilots.

Sincerely yours,

Stanley R Mohler, MD

Stanley R. Mohler, M.D.
Professor and Vice Chairman
Department of Community Medicine
Director, Aerospace Medicine

SRM/mer

Enclosure

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December 3, 1985

Mr. Roger Thomas
General Counsel
U.S. House of Representatives
Select Committee on Aging
Washington, DC 20515

Dear Mr. Thomas:

Dr. Flinn's written comments of November 12, 1985 are incompatible with modern neuropsychiatric practices of the FAA today in that the latter is routinely returning hundreds of airline pilots to duty who were medically grounded with chemical dependency conditions or other neuropsychiatric illnesses. The same neurologic, psychologic, psychiatric and flight assessments applied to a fifty-five year old (or any other age) airline pilot to assess neurologic mental, behavioral and performance competencies can be applied to a 60 year old non-chemically dependent, non-mentally ill, healthy pilot.

Dr. Flinn says there is no "physiologic index" of aging. This is a straw-man since ability to perform as demonstrated on modern simulators and freedom from impairing disease as shown by modern medical assessment techniques make it unnecessary to have a "physiological index" of aging. Dr. Flinn cites alcoholic pilots he has seen who were still demonstrating considerable proficiency. He doesn't state that many of these were undoubtedly identified early in their alcoholism or that these were encountered prior to the institution of modern simulators which will catch even minor deteriorations in performance.

Continued.....

Mr. Roger Thomas
General Counsel
Select Committee on Aging
December 3, 1985
Page Two

I have no idea why Dr. Flinn would maneuver from a constricted corner of the rich, vast, modern tapestry of medicine, science and aviation. I can only hope that his court-room advocacy for the defendent companies in Johnson vs. American Airlines and Iervolino vs. Delta Airlines hasn't frozen in place his scientific objectivity The logic he applies in his letter would scuttle the present FAA alcoholic pilot and other neuro-psychiatric programs I am sure he supports.

With best regards,

Stanley R Mohler

Stanley R. Mohler, M.D.
Professor and Vice Chairman
Department of Community Medicine
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December 3, 1985

Mr. Roger Thomas
General Counsel
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Select Committee on Aging
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Dear Mr. Thomas:

Dr. Charles Billings' letter of November 12, 1985 to Mr. Rinaldo clearly articulates the former state of affairs in medicine and aviation as existed twenty-five years ago. That scientific progress in medicine and aviation has far superceded his stated views is more than amply demonstrated by the testimony of the authoritative experts in medicine, science and aviation on October 17, 1985 before the Select Committee on Aging. In addition, the now common practice of the FAA in selectively returning hundreds of airline pilots to flight status who were medically grounded by disqualifying conditions objectively endorses the testimony.

Dr. Billings cites the possibility of a pilot developing deterioration of skills necessary for flight crew performance, yet he fails to recognize that the FAA regularly checks for these deteriorations and quickly grounds any pilot demonstrating these. He decries "population variability", yet this is a very basis for eliminating the "age 60" rule, that is, - many persons don't "age" as fast as others and are very competent at age 60. Modern methods of health and performance assessment will quickly identify these two groups.

Continued.....

Mr. Roger Thomas
General Counsel
Select Committee on Aging
December 3, 1985
Page Two

The remaining paragraphs of his letter use phrases as "sufficiently conservative", "persuasive evidence", "validated predictive tests", "quite expensive and time-consuming", phrases that he does not define and, thus, are meaningless. These same phrases could be used against the FAA's current special issuance practices for pilots grounded for alcoholism, myocardial infarction, coronary artery by-pass surgery, stroke, depression, and other serious illnesses. I assume Dr. Billings does not decry these modern FAA actions and his failure to do so flies in the face of his untenable stance today with reference to the age 60 rule.

In closing I would note that Dr. Billings has become something of a legal activist, recently entering several general aviation pilot age discrimination cases on behalf of the defendent companies, cases in which the FAA age 60 FAR 121 airline pilot rule does not even apply (for example, EEOC vs. Natural Gas Company, Williams et. al. vs. Hughes, and others). I would not wish to speculate on his motives but do note that his views in this respect are wholly incompatible with those of the FAA and NASA (this latter his own agency), both agencies supporting the use of pilots over 60 years of age to operate their large jet aircraft, high performance experimental aircraft, and many other types of aircraft.

With best regards,

Stanley R Mohler MD

Stanley R. Mohler, M.D.
Professor and Vice Chairman
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Director, Aerospace Medicine

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TODAY'S PILOTS

LIVING LONGER ENJOYING IT MORE

Proof positive that age discrimination is unjustified

BY STANLEY R. MOHLER, MD

Along with the adverse news entangling aviation today, let's take note of good news when it occurs. A recent report of considerable significance to pilots is *Health 1984*, issued by the Secretary, U.S. Department of Health and Human Services. HHS is the government's major medical research and health services arm, administering, among other things, the spectacularly successful, multi-billion-dollar National Institutes of Health medical research program (the fiscal year 1985 NIH budget was $4.9 billion, of which $140 million was for the National Institute on Aging). For these expenditures, we expect benefits—and we are getting them.

Health 1984 reports that the general health of most Americans is a nine on a 10-point scale. Since pilots are in the better-health segment of all Americans, the report has major implications for FAA medical certification policies. For example, it shows that, as a result of improved health, Americans are living longer, with the fastest-growing portion of the population being those who are 70 years old and older. The report shows that the 1983 life expectancy in the United States reached nearly 75 years, a whopping four years longer than as recently as 1970, and seven years longer than 1960, the year of the FAA's controversial "age 60" mandatory retirement rule. Although this rule is for airline pilots only, it adversely affects general aviation because some misguided nonaviation-oriented managements cite it to prematurely and illegally discharge healthy, performing, older pilots from flight duties. These actions have involved pipeline patrol, wildlife conservation, corporate and flight test pilots, as well as pilots in other categories of general aviation. In no case of pilot age discrimination has individual health status or individual pilot capability been cited, as each has been a pilot with current FAA certification. Rather, the archaic generalities of the age-60 rule are cited—an out-of-date rule, as underscored by the HHS report that life expectancy was increased seven years since this regulatory relic was instituted.

Health 1984 gives some specific reasons for the recent remarkable increases in the longevity and health of Americans: improved eating habits; generally better overall living habits; decreases in tobacco smoking; decreases in the consumption of alcohol; increases in sensible exercise activities; and the greater achievement of adequate rest on a regular basis. These life-style practices have been increasingly adopted by millions of Americans, especially since the late 1960s. Phenomenal progress also has been made in many medical diagnostic techniques and treatment methods. Tens of thousands of additional people currently would be expiring of now-preventable diseases if this progress had not taken place.

To illustrate further the spectacular achievements continuing to occur in longevity and health, a person in the United States who reached age 65 in 1983 can expect to live another 16.8 years today. Many are living to be 100 years old. The 1980 census counted 32,000 persons alive in the United States over 100 years old—a record figure, and climbing daily. I know of at least one centenarian who recently took her first airplane ride. A significant number of our older citizens are mentally clear, physically healthy and are living normal lives. Some are aerobatic and/or racing pilots; some are presidents of corporations. One is President of the United States. Figure 1 (p. 32) shows the number of active pilots in the United States who are over the age of 60 as documented

LIVING LONGER ENJOYING IT MORE

Figure 1

The number of active pilots in the United States who are over age 60 is shown by age bracket and sex.

Age	Male	Female
60-64	27,564	778
65-59	10,507	265
70-74	3,256	82
75-79	761	22
80-84	162	5
85 and over*	42	0
Totals:	42,292	1,152

Grand total: 43,444

**Five of these are in the 90-year-plus bracket.*

[illegible] MEDICAL STATISTICAL HANDBOOK FOR [illegible]

Since 1970, heart disease death rates have dropped 26 percent and strokes have decreased by 48 percent.

by the FAA. These are at record numbers and reflect modern health and improving health trends in the United States. Five of the pilots in the over-85 bracket are 90 years of age or older. It is interesting to note that the number of active pilots over the age of 60 in the United States exceeds the number of pilots in most of the rest of the world.

Between 1970 and 1983, heart disease death rates precipitously dropped 26 percent, and strokes decreased by a staggering 48 percent. These improvements in our overall health occurred because of the above emphasized points, especially: decreased cigarette smoking; better control of hypertension; better diagnosis and control of diabetes; better control of cholesterol intake and lowered blood cholesterol levels; better management of obesity; increased exercise; and marked decreases in the amount of per capita consumption of alcohol. Other factors, of course, play a role, but these are some of the major factors. Most are under the individual's direct control.

It is now much more clearly understood by scientists and physicians that the normal aging process is just that—a continuation of the normal developmental process, with genetically programmed changes that evolve on plan throughout life, from conception through infancy to old age. Any person can be a potentially healthy, functioning centenarian with an essential absence of significant disease. In this respect, the aging process itself is now known, as stated, not to be a disease but rather a programmed, genetically encoded, continuing developmental process. When understood in this modern scientific light, chronologic age is not abused as an arbitrary marker for cutting healthy motivated capable persons from activities or work where they are fully qualified. The 1981 White House Conference on Aging called for an end to mandatory maximum age requirements—a recognition of medical progress and the almost criminal wastage of productivity through the arbitrary use of premature mandatory retirements. The old prejudice that date of birth is a valid justification for removing a capable motivated individual from gainful employment—whether that of pilot or otherwise—is no longer justified from medical, operational, behavioral, moral, ethical or safety standpoints. A mandatory age-60 "service limit" for pilots in any segment of aviation is an unjustified anachronism today. Health assessment plus individual performance evaluations can adequately determine an individual's status. In the final analysis, the absence of impairing disease, the ability to perform and the motivation to continue constitute the valid means to allow older persons (or persons of any age, for that matter) to continue in various pursuits, including flying.

In addition, modern medicine now recognizes that diseases are acquired "add-ons" to the normal developmental process (unless genetically inherited as, for example, occurs in the condition of muscular dystrophy). Disabilities, loss of medical certification and death are the result of acquired or inherited diseases or accidents. The classic scourge infectious diseases have been largely eliminated today, in contrast to their rampages in the pre-antibiotic era. Many cancers are under control today, thanks to early diagnosis and better treatment. More than 50 percent of today's cancer victims are receiving "cures," a percentage increased severalfold in the past quarter century. In addition, various inherited diseases are cured or controlled today to an extent never before believed possible. (For example, a specific liver disease, "Wilson's disease," uniformly fatal until recently, can now be treated two ways, each offering complete control—and one gives a complete cure. The disease is an inherited "copper storage" disease, where copper is excessively stored in the liver of its victims in ever greater amounts throughout childhood and into the teenage period. The unfortunate victim cannot eliminate copper in the bile as is normally done. Gradually, toxic symptoms develop, usually in the teenage or young adult stage, when copper spills over into the nervous system and elsewhere in the body. The patient loses the ability to coordinate body movements and ultimately dies of this or liver deterioration. Today, penicillamine, if introduced soon enough, can be used on a regular basis, allowing the liver to move the copper out, thus saving the individual for what, in essence, becomes a normal continuing life. A more radical treatment is that of liver transplant. A new liver can be put in place, providing a total cure. These recent developments are examples of the spectacular medical advances that are characterizing all aspects of medicine today.)

The highly successful surgical by-pass procedures used to treat coronary artery disease and the recent coronary dilation techniques performed with long thin, inflatable balloons placed temporarily in the coronary artery ("balloon angioplasty"), are allowing the safe return of hundreds of pilots to full unrestricted flight status. These pilots are in all categories—student, private, commercial and airline. These "plumbing" corrective procedures for obstructed coronary blood vessels result in markedly improved blood flow to the heart muscle. Many of the restored pilots had abused their health through life-style practices that promoted high risk factors for coronary artery disease during their young adult lives. Following surgery (an attention-getting experience), many have decreased their cardiovascular risk factors and have essentially become normal, healthy individuals.

In the neuropsychiatric area, hundreds of pilots have been safely returned to flight status following protracted bouts with alcohol and the diagnosis of alcoholism. Today, with our better understanding of the brain and its associated nervous system, along with modern neurological assessment techniques, addicted pilots who quit drinking alcohol can be returned to unrestricted flight duties following an evaluation of their general health and functions of memory, logical thought, emotions and coordination, demonstrating that no significant damage has been incurred.

Paralleling the spectacular medical advances cited above are operational advances in assessing pilot performance capabilities. There are modern simulators today that are so valid in regard to duplicating real-life flight conditions and aircraft characteristics that a pilot may receive an FAA type certificate in a given aircraft through training received only in the simulator for that aircraft. The first time these pilots carry passengers in revenue flight can be their first flights in the aircraft following simulator training. Simulators can load the pilot with escalated and compounded operational and emergency procedures that would be unthinkable during actual flight checks in an aircraft. If there is any question about a given pilot's health and/or performance capability, it is very clear that these can be fully assessed today, and, in fact, such assessments have become routine.

In further comment on pilot longevity and the age issue, every study of aircraft accident data concerning accidents experienced by commercial- and ATP-certificated pilots in general aviation (use of these data controls for the inexperience factor) shows that the accident rate per thousand pilots decreases by age of the pilot (see Figure 2, below). This is the basis for the FAA's refusal to institute an age-60 rule in air taxi, air commuter, corporate, flight instruction, flight test, aerial application, charter or other non-airline commercial operations, all part of "general aviation." There is no age-60 limit in Part 67 of the Federal Aviation Regulations, the part prescribing the first-, second- and third-class medical certificates. There is no age limit in Part 91, the general operational regulations, and there is no such limit in Part 135, covering air taxi and air commuter operations. The only U.S. regulatory upper age limit for pilots is in FAR Part 121 and covers only the captain and copilot—not the flight engineer. Many countries have no governmental age-60 limit for any pilot, including our neighbors, Canada and Mexico.

The FAA age-60 regulation had as its original justification the 1940s and 1950s heart disease epidemic found then in many adult males of the American population. Also at that time, poorly understood mental and cardiovascular conditions, many related to alcohol, tobacco and other factors but not then tied to these by the medical or lay community, were cited in the justification as the result of aging. These original justifications have been eradicated by the spectacular progress in medicine, improvements in health and lengthened lifespan as documented by HHS.

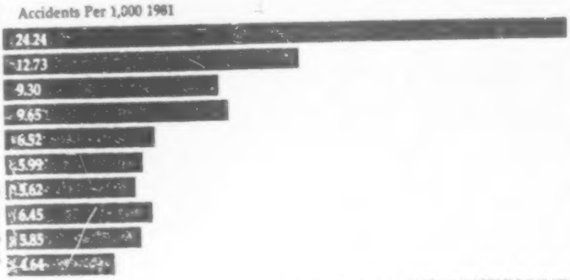
In summary, there seems to be within organized societies an inherent tendency by some elements to attempt to extend unnecessary controls and limits to other segments of society, sometimes invoking outdated concepts to justify the institution or continuation of prejudicial policies. We must fight this tendency to the greatest extent possible, whether originating in government or various industries, ere our flying incur additional detrimental restrictions based on invalid or outdated assumptions. □

Dr. Stanley R. Mohler, AOPA 167639, received the 1984 Lawrence P. Sharples Award. He is director of aerospace medicine at Wright State University.

Figure 2

PILOT AGE AND ACCIDENTS: 1981
General Aviation Operations
Pilots in Command with Airline Transport or Commercial Pilot Certificate

Age	Active Pilots 1981	Number Accidents Expected 1981	Number Accidents Observed 1981	Accidents Per 1,000 1981
16-19	330	2	8	24.24
20-24	12,565	92	160	12.73
25-29	27,735	189	258	9.30
30-34	36,770	270	355	9.65
35-39	41,735	306	272	6.52
40-44	34,532	253	207	5.99
45-49	29,556	217	166	5.62
50-54	20,295	149	131	6.45
55-59	18,609	137	109	5.85
60+	18,764	138	87	4.64
Totals	238,891	1,753	1,753	



SOURCE: NTSB AND FAA STATISTICAL HANDBOOK FOR CY 1981

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December 12, 1985

Mr. Roger Thomas
General Counsel
U. S. House of Representatives
Select Committee on Aging
Washington, DC 20515

Dear Mr. Thomas:

Thank you for the opportunity to comment on the effects of aging on human performance.

By training, study and profession I am a psychologist. Psychology has been called the science of individual differences, and the challenge of psychology has been to perceive, identify and measure individual differences in increasingly reliable and valid ways.

None save a fool would say "all women are alike", "all Texans have oil wells", "all Catholics eat fish on Friday." We recognize that although the members of a group may have some characteristic in common -- femaleness, a home in Texas, Catholic faith -- there is no implication that each member of a group is identical in all respects to every other member of that group.

But in the event one does NOT recognize and honor the essential differences in individuals, the United States government has laws that insure that a person's membership in a particular sexual, ethnic or religious group does not over-ride the fact that each individual is unique. How then does a government countenance a rule which alleges all pilots become supernumerary on a sixtieth birthday?

How accurately can one quantify individual differences? Psychology is at once one of the oldest and one of the newest sciences. Differences in individuals have been formally observed, named, classified, and measured by psychologists for a hundred or more years but long before, a Shakespeare could say of Lady Macbeth, 'Methinks she doth protesteth too much." Parenthetically, he did NOT say, "all Danish women of title pretend to an undeserved innocence."

Whether old or new, the healthy scientific discipline draws upon its sister-sciences to broaden its observations, define its classifications, and refine its measurements, thus fulfilling the obligation of science, prediction.

The individual scientist also has obligations: he must maintain familiarity with investigations and literature which are compatible with and against his own position, and he may make scientific comments only when his training and experience so qualify him. In responding to your request that I comment on enclosures regarding Dr. Charles E. Billings and Dr. Don E. Flinn, I will attempt to keep within my area of expertise (shown in Enclosure 1, my curriculum vitae). I am told Dr. Billings is certified by the American Board of Preventive Medicine in Aerospace Medicine, and Occupational Medicine. Dr. Flinn, whose orientation has been described to me as psychoanalytical, is Chairman, Department of Psychiatry, Texas Tech University School of Medicine.

From the enclosures you sent, it appears Drs. Billings and Flinn take the position that performance by operators of man-machine systems depends on a sufficient supply of oxygen. I agree, so far as that goes. But estimating equations which predict a person's performance from his oxygen utilization consumption at a level of statistical significance have not been reported to my knowledge. Also, while Thallium-Technitium scanning has been reported as a tool in the assessment of cerebral blood flow, a scanning technique using Xenon is superior (in the opinion of John S. Meyer, M.D., Director of the Cerebral Blood Flow lab and Professor of Neurology at the Baylor University College of Medicine). Xenon is the technique of choice since it presents fewer blood-brain barrier problems than does the Thallium-Technitium technique. (Enclosure 2 is an old paper of mine; this was a preliminary report on the relationship between man-machine operator performance and oxygen utilization/consumption. But I must decline further comment on cerebral blood flow as I am not qualified as an expert in that area.)

Drs. Billings and Flinn comment on "tests of cognitive function," and in that area I do qualify as an expert. Certainly, I would agree with Dr. Flinn's position that no formalized equation exists which would integrate all of the perceptual, intellectual, psychomotor, and psychophysiological functions. There are, however, techniques which predict flying performance under routine and under emergency conditions which are (a) age related and (b) correlated with such physiological functions as are measured by event-related brain potentials and bio-chemical markers. My technique which fulfills these criteria is PRIME, first presented as long ago as 1973 at the 8th International Symposium on Aviation Medicine. In the intervening years, PRIME has routinely evaluated thousands of pilots; used, too, in an FAA funded study in 1980, an "addendum" to the "Thousand Aviator Study" of the U.S. Navy. There are other age-related techniques which can determine an individual's level of function, some developed by me and some developed by others. It must be remembered, however: understanding does not come from the denial of emerging technology.

For your additional information: Enclosure 3, notes prepared for my appearance as expert witness in a case of alleged age discrimination; and Enclosure 4, a paper given at the 25th International Congress of Aviation and Space Medicine (Helsinki) which presents my theoretical orientation to the effects of aging, disease and trauma on human information processing.

Again, I appreciate your confidence in making inquiries of me, and am pleased to respond. Please call on me for any elaboration or additional information which I can provide and which may be useful to you.

Very sincerely yours,

David B. Vinson, Ph.D.

enclosures: as cited

Journal of Affective Disorders, 5 (1983) 281–287
Elsevier

Neuropsychological Dysfunctions in Unipolar Nonpsychotic Major Depressions

A. John Rush [1], Jan Weissenburger [1], David B. Vinson [2] and Donna E. Giles [1]

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(Received 22 June, 1982)
(Revised, received 14 January, 1983)
(Accepted 2 February, 1983)

Summary

Twenty-two patients with unipolar, non-psychotic major depression were evaluated with a neuropsychological test battery. The endogenous patients performed more poorly than the non-endogenous on the test battery as a whole. When compared to performance norms obtained from non-depressed controls, both E and NE groups showed performance impairments on the majority of subtests in the battery. The test battery employed in the present study may be clinically useful in assessing neuropsychological alterations in patients with mild to moderately-severe depression.

Introduction

Alterations in memory, concentration and decision making are accepted concomitants of clinical depression and included as diagnostic symptoms for Major Depressive Disorder by both the Diagnostic and Statistical Manual III (APA 1980) and the Research Diagnostic Criteria (Spitzer et al. 1978). The empirical evidence for these neuropsychological dysfunctions is based primarily on severely depressed inpatients. These data suggest that moderate to severe depressions are associated with deficits on neuropsychological and memory tests. In contrast, more mildly depressed pa-

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tients have not been consistent in showing experimental evidence of impaired information processing and memory (for reviews, see Miller 1975; Stromgren 1977; McAllister 1981).

The present report provides empirical evidence of impaired information processing and memory in a sample of mild to moderately depressed, unipolar, nonpsychotic, in- and outpatients. Further, the neuropsychological functioning of patients classified as endogenous and non-endogenous defined by Research Diagnostic Criteria (RDC) (Spitzer et al. 1978) is examined. The test procedure used in the present study provides a clinically applicable means of measuring neuropsychological functioning in mild to moderately depressed patients.

Material and Methods

Subjects

Subjects were 17 outpatients and 5 inpatients seen in the Affective Disorders Unit, University of Texas Health Science Center. All subjects, interviewed according to the Schedule for Affective Disorders and Schizophrenia – Life Time Version (Endicott and Spitzer 1978), had RDC diagnoses of unipolar, nonpsychotic, major depressive disorder, and at the time of neuropsychological testing, had a 17-item Hamilton Rating Scale for Depression score of greater than or equal to 14 (Hamilton 1960). Nine of the 22 patients tested met criteria for endogenous (E) depression by RDC. The remaining 13 patients were non-endogenous (NE). All patients were free of psychotropic medication for a minimum of 5 days prior to testing.

Test battery

Standardized neuropsychological test battery composed of both previously developed and new tests was used. The test battery. developed by Vinson (1973) assesses the accuracy of visual and auditory information processing and memory, as well as visual filtering and visual-motor performance. Validation studies show the test battery to be culturally fair, and sexually and educationally unbiased (Vinson et al. 1976).

The battery has previously been used in studying psychobiological decline associated with aging (Vinson 1978a, 1980; Mohler 1981), altered states of consciousness following alcohol ingestion (Vinson 1978b) and has been correlated with specific event-related brain potential (Williams and Dubrovsky 1979). This battery has also been tested in psychiatric populations to evaluate its relationship to descriptive classifications. Using independently determined DSM-II diagnoses as validation criteria, test findings were compatible with a disorder of thinking, feeling or behavior (Vinson 1979).

Data from the test battery were analyzed using a computer software program called PRIME, which utilizes a normative data base of over 10,000 subjects aged 15–84, in the proportion found in the total population of the United States. The data base includes non-supervisory, supervisory and managerial subjects, as well as scientists, executives, athletes, pilots, and several classes of unemployed persons.

The five tests included in the test battery are scans, spans, trailmaking, color-word and mental time sharing. The specifics of each test follow.

(i) Scans

In the scans test of visual memory, the subject faces a screen on which a series of 9 cell (3 × 3) matrices are sequentially projected. Each cell in the matrix contains a number from 0 to 9, with one number missing in each trial. The subject scans the display for 3 sec to determine the missing number; subsequently, 3 sec are provided for the subject to write the number on an answer sheet. A total of 20 trials or displays is given. For each display, the numbers are arranged in a different order and the missing number is varied.

(ii) Spans

The technique of measuring auditory memory without retrieval, first developed by Buschke (1963), is adapted for the spans test of short-term auditory memory. The subject listens to an audiotaped presentation of 8 of the 9 numbers from 1 to 9. The numbers are presented in random order at a rate of 1/sec. The task is to determine which number was *not* presented and write it on an answer sheet. Twenty trials are given. The missing number and order of numbers varies from trial to trial.

(iii) Trailmaking

The trailmaking test is the standard part A of the two-part test developed by Reitan (1958a, b). It requires the subject to connect, in sequential order, the numbers from 1 to 25 that are printed randomly on a page. The resultant visual motor speed score consists of the time (in seconds) to complete connection of all 25 numbers.

(iv) Color-word test

Color-word test uses the Stroop color word test (Stroop 1935) to measure rate of visual filtering. This test presents names of colors printed in colored ink, with the work and the ink color mismatched. Visual filtering is invoked when the subject must suppress the word name and verbally respond with the ink color. Rate of visual filtering is the time in seconds for the subject to respond to 45 stimuli printed on a 5 × 9 card. The speed score reported is the time in seconds to respond to all stimuli on the second of two trials using the same stimulus card. A measure of the number of 'errors' is also taken, defined as the number of incorrect responses.

(v) Mental time sharing

Mental time sharing (MTS) is a task developed to assess the ability to carry out simultaneous attentional and information storage/retrieval operations (Vinson and Walter 1977). In this test, the subject listens to audiotaped presentation of numbers in random order at a rate of one number per second. As in spans, the task is to determine the missing number for each trial. After the numbers are presented, however, the response must be delayed for a 10-second pause period. Following this pause, the subject responds by writing down the missing number. Then the subject must write down, for as many as remembered, the numbers actually presented in the

TABLE 1

DEMOGRAPHIC AND DEPRESSION SEVERITY DATA

		Endogenous (n = 9)	Non-endogenous (n = 13)
Sex	Female	8	9
	Male	1	4
Race	White	7	13
	Black	2	0
Age (yr)	mean (SD)	37.6 (12.2)	37.9 (9.1)
Education	mean (SD)	14.4 (1.4)	14.4 (2.8)
HRSD	mean (SD)	25.2 (4.5)	21.5 (5.0)
BDI	mean (SD)	26.9 (5.6)	24.5 (10.2)

order of presentation. Trials are given for spans of 5, 6, 7 and 9 digits. In scoring, credit is given for the trial only if the missing number is filled in correctly.

Procedure

On the day of testing, each subject was individually administered all 5 tests of the battery and was evaluated with the 17-item Hamilton Rating Scale for Depression (HRS-D) (Hamilton 1960) and the 21-item Beck Depression Inventory (BDI) (Beck et al. 1961). Results of PRIME testing were obtained independent of and blind to the clinical diagnosis and severity ratings.

Results

Table 1 presents basic demographic characteristics of the endogenous (E) and non-endogenous (NE) subject groups. The groups did not significantly differ on any of these variables, using chi-square tests for sex and race variables, and *t*-tests for age and education level (all $P > 0.05$). T-tests on HRSD and BDI revealed that severity of depression was equivalent for the groups as well.

TABLE 2

T-SCALE SCORES COMPARING DEPRESSED SUBJECTS TO CONTROLS [a]

	Endogenous (n = 9)	Non-endogenous (n = 13)	Total Sample (n = 22)
Scans	53.89 (11.12)	54.62 (10.10)	54.32 (10.27)
Trailmaking	33.18 (14.29)	41.72 (11.98)	38.23 (13.35)
Spans	47.28 (10.78)	53.50 (9.16)	50.95 (10.10)
Color-word test	41.29 (12.73)	46.48 (13.13)	44.35 (12.92)
Mental time sharing	35.64 (9.01)	46.25 (10.12)	41.91 (10.86)

[a] Standard deviations are shown in parentheses.

TABLE 3

COMPARISON OF RAW SCORES IN ENDOGENOUS AND NON-ENDOGENOUS PATIENTS[a]

	Endogenous (n = 9)	Non-endogenous (n = 13)	t ($df = 20$)	P
Scans	17.33 (3.08)	18.38 (1.39)	− 1.09	0.29
Trailmaking	48.57 (13.82)	40.83 (11.58)	1.42	0.17
Spans	12.44 (3.81)	14.38 (3.45)	− 1.24	0.23
Color-word test	45.73 (11.82)	47.06 (20.65)	− 0.17	0.86
Mental time sharing	35.33 (25.60)	55.62 (25.31)	− 1.84	0.08

[a] Standard deviations are shown in parentheses.

Test scores for all subjects were compared by the PRIME computer software program to the distribution of data base scores obtained by an age-matched population of normal subjects. The resultant T-scale scores on the 5 tests are presented in Table 2. The t-scale score is based on a normal distribution with a mean of 50 and standard deviation of 10. Thus, a t-scale score of 50 represents a performance level at the mean of the distribution of scores obtained by the control population. Scores less than 33.6 are significantly reduced (one-tailed $P < 0.05$). For the endogenous subjects, the scores on four of the five tests indicated a somewhat decreased performance, but only the trailmaking test was *significantly* lowered ($P < 0.05$). While non-endogenous subjects scored below the mean of controls on 3 of the 5 tests, non of these reductions were significantly different than controls.

Table 3 presents mean *raw* scores on the 5 tests and values derived from Student's t-tests comparing E and NE groups. Performance on all 5 tests was consistently poorer in the E than in the NE group. A paired t-statistic calculated on the PRIME battery as a whole revealed a significant difference between endogenous and non-endogenous groups ($t = 3.74$, with 4 df, $P < 0.05$). Student's t-tests failed to show significant differences between E and NE groups, when each of the 5 individual PRIME tests was analyzed separately, although the raw data would suggest that mental time sharing would be most sensitive in differentiating these two groups.

Raw performance scores from the test battery were correlated with depression severity ratings (HRSD and BDI) for the total patient sample, and separately for E and NE groups. None of these correlations was significant.

Discussion

The present study evaluated the neuropsychological performance of patients with mild to moderately severe non-psychotic, unipolar major depression. The results provide confirmation of previous findings showing deficits on cognitive, memory and information processing tasks in depressed patients. Performance level was significantly below normal on the trailmaking test in E, but not NE, depressives. As a timed, visual-motor task, trailmaking may be influenced by psychomotor retardation. Since one of the identifying symptoms of E depression is psychomotor retardation, the significantly poorer performance by E depressives may reflect psychomotor retardation in this group.

Despite the lack of statistical significance, results also provide evidence of impairment of performance on the majority of tests in the battery, even among non-endogenous patients. In considering the implications of these results, one must consider that the performance scores were analyzed as group data; and within the group the pattern of performance on each test varied from subject to subject: for any given test, performance by some subjects showed gross impairment, while performance by other subjects was normal. Because such wide variations exist, group data tended to obscure the actual severity of deficits exhibited by certain subjects on individual tests. It would be of interest for future research to examine the potential diagnostic and prognostic implications of differing patterns of performance on the 5 tests. Further, the results of the present study suggest that type of depression (E vs. NE) plays a role in determining performance level.

The test battery used in the present study is a standardized, easily administered instrument which may provide a clinically useful test for detecting alterations in neuropsychological functioning in both in- and outpatients with mild to moderately severe depression. Whether the PRIME test procedure may also be clinically useful in distinguishing mild to moderate major depressions from early dementia or organic affective disorders for which greater impairments on the tests are likely deserves study.

Acknowledgements

The authors wish to express their appreciation to Ms. Marie Marks and Ms. Anita Roman for their secretarial support and to Kenneth Z. Altshuler for his administrative support.

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ENCLOSURE 2

APR. 15/9:00-12:00/CAMELLIA

SESSION XIII: Biotelemetering III

THA 13.4: Telemetry in a Driving Safety Study

V. P. Collins, W. D. West, W. G. McTaggart and A. R. Maxwell

Baylor University College of Medicine, Houston, Tex.

D. P. Vinson

Texas Academy for Advancement of Life Sciences, Houston, Tex.

THIS REPORT will describe the physiological effects of auto driving upon the individual, considering this activity as a common environmental stress. We like to think that our conscious and voluntary acts are the result of logical thinking, good judgment and prompt decision, at least as far as we ourselves are concerned although others may be less reliable. But these acts are subject to modification by the internal physiological milieu responding involuntarily and subconsciously to environmental stimuli. Teleologically considered, the purpose of such physiological devices is to improve the chances for survival. However effective such preparation for flight or fight may once have been in a harsh but uncomplicated environment of the jungle, the persistence of this mechanism may be more menace than assistance in normal street and highway traffic.

The studies to be discussed were initiated in association with auto racing but, with recognition of the wider possibilities for application, attention was expanded to include street and highway driving. In this telemetry conference we will limit the report to in-car responses and we will deal with the product of, rather than the technic of, telemetry. The total investigation includes not only in-car responses, but studies carried out before and after driving, consisting of physiologic tests of cardiovascular functions, a battery of biochemical tests of blood and urine and psychologic testing of individuals.

Monitoring of physiologic responses in action may be by telemetry or by in-car tape recording. For our purposes the advantage of telemetry has been the continuous and immediate display of the function under observation. This is particularly important when some corrective action is possible in the face of danger, as during a race, and it is only feasible when the course of the vehicle is limited to a closed circuit within the range limits of the telemetry equipment. It plays less part in highway testing where protracted monitoring on open streets or highway is more simply recorded on tape. If reliance is entirely upon telemetry the possibility of a failure means that valuable data may be lost. Further, the taped electrocardiogram signal has a better potential for analysis of cardiac function and may be more conveniently stored for restudy than has the immediate visual readout of an ink tracing.

We have therefore developed a split signal allowing: (1) — a telemetry signal for immediate visual display on either an oscilloscope or ink tracing at a conveniently located receiving center and (2) — an in-car tape recording for a permanent record for later analysis; Figures 1 and 2.

From accumulated material, selected records are presented to illustrate the information gained and the questions raised.

In a telemetered record of a 28-year old driver during a sports car race a sharp rise in heart rate was noted during the seconds immediately before the start of the race (termed *anticipatory*), but the magnitude of the rise is apt to be considered surprising. Nevertheless, a heart rate of 160-200 is a constant observation even among professional race car drivers. This is maintained until the end of the race or until the individual is out of competition as in this case where a mechanical failure occurred.

A second race driver, age 51, Figure 3, shows again the abrupt increase in heart rate from 140 to 180 beats per minute at the start of the race: (1) this is maintained until a minor accident; (2) damages a wheel necessitating a slower pace (as the driver continues at reduced speed and no longer in competition); and (3) the heart rate slows. A second accident removes two leading cars from competition and with the prospect of winning or placing restored, speed is increased and heart rate obediently rises. At the end of the race, (4) the heart rate abruptly falls.

The driver in Figure 4 is the same as in Figure 3, now braving morning rush hour traffic in a Volkswagen. The heart rate slows during a 2-minute wait (1) sitting quietly in the car. There is an abrupt increase (2) while moving out of the driveway into the street and a decrease (3) as traffic accumulates before a traffic light. Beyond the traffic light an acceleration in speed is matched by an acceleration in heart rate, a pattern repeated at the next stop light. Entering a complex of curves in a multi-plane intersection of freeways, heart rate rises and reaches a maximum of 135 (5) as traffic merges at 70 mph. Thereafter heart rate slows and quickens with traffic fluctuations (6, 7) and subsides to a basic level in the safety of the parking lot.

In Figures 5 and 6 the heart rate of a 17-year old girl is recorded driving from laboratory to home in evening traffic and from home to laboratory in morning traffic. Again the heart rate shows peaks and depressions in the range of 90 to 120 coinciding with driving responses to traffic incidents. Superimposed on the driving responses, there may be an anticipatory response to a new and strange experience at the laboratory; there is an upward trend reaching a maximum of 120 when electrodes are removed at the laboratory and a down-

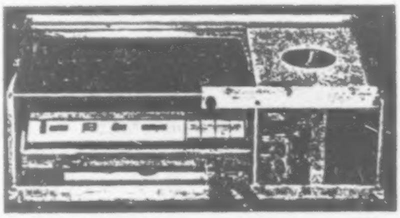

FIGURE 1—**Portable unit combining tape recorder and transmitter.**

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[*] These tests are under the supervision of D. Vinson.

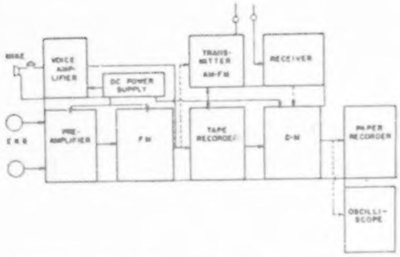

FIGURE 2—Block diagram of portable tape recorder and transmitter.

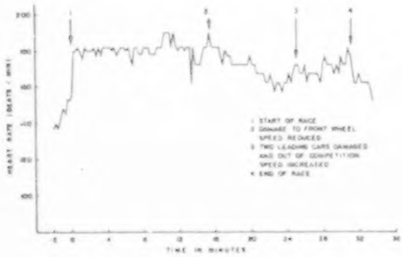

FIGURE 3—In-race record of heart rate of race car driver, age 51.

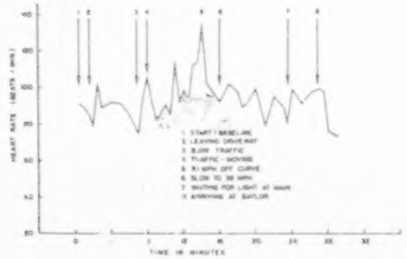

FIGURE 4—In-traffic record. Heart rate of driver, age 51, driving on street and freeway.

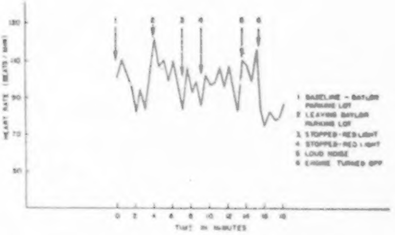

FIGURE 5—In-traffic record. Heart rate of female driver, age 17, driving from laboratory to home (evening).

ward trend to less than 80 on reaching the familiar driveway at home.

In Figures 7 and 8 the reaction of a 30-year old woman as passenger and driver are compared. As a passenger in heavy traffic, there are numerous peaks of 90 to 100, but as a driver in equally heavy traffic, a rather level record in the range of 70 to 80 is maintained. It comes as no surprise that one accustomed to driving may be more acutely responsive to highway episodes when deprived of direct control over the vehicle, and perhaps engage in compulsive back *seat driving*.

The physiologic monitoring of auto drivers focuses attention on this daily activity as an important environmental stress to which the individual may respond physiologically in a dramatic fashion.

The magnitude and speed of the rise in pulse rate at the start of an auto race, even among professional drivers is consistently of the order of 180 beats per minute. On a priori grounds, such a rate might be thought to be inefficient, but the consistency of the finding calls for further study. At the moment of increase, work is not being done and oxygen demand is not increased. Cardiac output is usually calculated on a basis of oxygen utilization. If this is a dependable relation, then the rapid heart rate is associated with an unchanging cardiac output and a diminished stroke volume. The advantage of this is not apparent but might alter our concept of cardiovascular function if confirmed. If on the other hand, cardiac output is increased without an increase in oxygen consumption, the mechanism of *anticipatory* increase in heart rate would be clarified, but calculations of cardiac output based on oxygen consumption would be unreliable.

The precipitous drop in pulse rate on completion of a race is evidence that, in the absence of an accrued

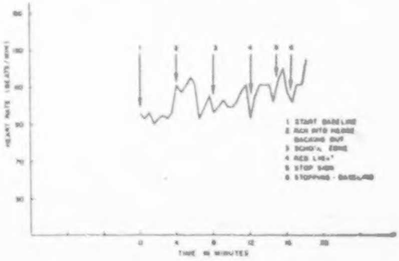

FIGURE 6—In-traffic record. Heart rate of female driver, age 17, driving from home to laboratory (morning).

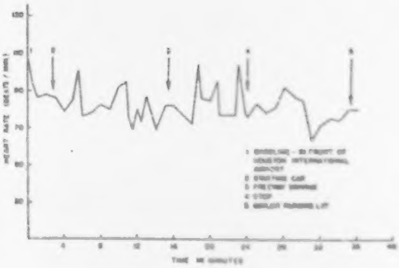

FIGURE 7—In-traffic record. Heart rate of passenger, age 30.

oxygen debt, the control mechanism is equally sensitive to removal of environmental stress.

Cardiovascular responses in racing and on the highway show a similarity, at least in some drivers, to suggest a comparable environmental stress. However, there are recognizable variations in patterns. The question arises whether preparation for *fight or flight* is still a useful automatic adjustment for highway needs, or whether the individual with a slow and level pulse in heavy traffic indicates a restraint better suited to cope with the artificial if civilized rules of street and highway driving.

The practical application of such physiologic studies lies in the possible influence on performance. If a large series of drivers should eventually be studied, a comparison with driving records might be possible. Presently suitable psychologic tests are being evolved for subjects participating in both racing and highway studies*.

Subjects in the study are being given a psychologic test battery consisting of three sub-tests; a personality inventory, color naming test, and tests of short term memory storage modified from those developed by Buschke. On the basis of the performance in these tests, race car drivers are no more neurotic nor extroverted than is the individual of a random sample of his age and sex. Level of aspiration, as assessed by the color naming test, tends to be more optimistic in the race car driver than in the average subject. Speed under stress is at the mean; errors under stress are well within normal limits. There is no significant difference between the performance of the race car driver and the average subject on the tasks of information storage and retrieval.

Efforts to improve driving safety have properly been directed to areas where substantial results could be expected—vehicular construction, traffic control and driver education. More could be done in all of these areas than law makers are willing to require or citizens are willing to accept. The physiologic response to driving is barely touched upon by the material presented here, but it is probable that the lessons to be learned in the field will reinforce safety studies by more carefully describing the principal factor, the driver himself.

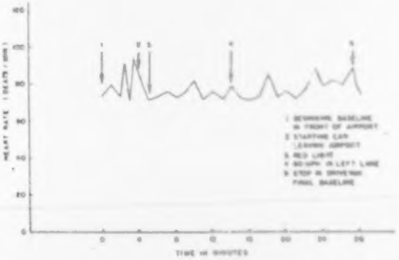

FIGURE 8—In-traffic record. Heart rate of driver, age 30.

ENCLOSURE 3

12-12-85, 9:00 AM
NOTES: D. B. Vinson, Ph.D.
page 1

The bio-electrical and bio-chemical investigations of biologic psychiatry have replaced psychoanalysis in man's attempt to understand and explain mental functions and disorders. It is my position that recent investigations in physiology and neurobiology provide psychology with the necessary and sufficient information to replace (or to integrate, at least) the human factor model of performance which has been limited to measures of psychomotor and abstract functions with the broader measures of the neurophysiolgic model.

In science, there has often been a reciprocal relationship between theory and the development of instruments. An instrument generates a newer theory, and a new theory calls for development of instrumentation to test the theory. For examples, prior to 1944, pathophysiology of the central nervous system was assessed by the passive electroencephalographic recording of the brain's waves (the EEG). In 1944, Dennis Hill, M.D. hypothesized the presence of electrical activity in the brain beyond that seen in the passive EEG; he introduced hyperventilation and elicited those suspected patterns. In 1953, photic stimulation (active EEG) was used by W. Grey Walter, D.Sc. to investigate the subclinical spike and wave discharges associated with petit mal epilepsy. Eleven years later he developed instrumentation which enabled him to "tease" out the recording of a subtle electrocortical sign of brain activity, the CNV. Later, the CNV was recognized as the first "event-related brain potential," a demonstrable electrical sign that a brain was computing the probability of the occurence of an event. Walter and I discussed the likelihood that presenting a subject with a task of information overload would diminish the amplitude of his CNV; subsequently, the technique of mental time-sharing was developed by me to assess overload on human performance as that was mirrored in the CNV and other event related brain potentials. The test of mental time sharing could have been developed without the CNV; and the CNV had existed even when there was no instrument to observe it. Only when test, CNV and instrument came together could the worth of the task of mental time-sharing be seen.

Williams and Dubrovsky, McGill University, gave the task of mental time sharing to subjects while the CNV was monitored. They found "the results clearly revealed that the amplitude of the CNV provides an objective index for the evaluation of brain activity during performance of a task of mental time sharing." There was, in fact, a statistically significant agreement between performance on the task of mental time-sharing and the CNV amplitude.

Also in 1979, Michihiko Nakamura et al reported in "A comparison of the CNV in young and old subjects" that the average CNV amplitude under reinforcement conditions decreases prominently at ages over 65 years, but as I had begun to discover although there were differences in the means of performance of subjects separated into age groups, there were greater individual differences within the groups than there were differences betwen the age-specific groups.

The exchange between theory and instrumentation has also occured in neuropsychology. Once defined as "what psychologists do," psychology may be viewed as Enoch Callaway recently suggested, "that branch of information science which deals with living systems."

In 1952, the thesis for my doctorate at the University of London hypothesized one essential difference between living and non-living systems: when a non-living system is isolated and placed in a uniform environment, molecular activity ceass due to friction, and this end state in which no observable change may be detected is termed the "state of maximum entropy." But, when a living system is isolated and placed in a uniform environment, it has the ability to maintain its existing order by establishing an "exchange" between itself and its environment."

Schrondinger had hypothesized that the capacity of a living system to maintain itself on a low entropy level was associated with the molecular arrangements characterizing its hereditary "material." It was my hypothesis that failure, or success, of a living system to maintain its "order," might be detected by repeated assessments at different time itervals. I suggested the term "psychobiological decline" to describe a particular living system's inability to maintain its previously attained level of function, and recommended the development of objective measures which would be capable of detecting even subtle shifts in psychobiological integration.

When Weiner and Shannon reported a statistical measure for negative entropy (Schrondinger's negentropy), it appeared that the recomended objective measures for the assessment of psychobiological decline could be based on "information theory."

Thus, in a 1967 paper, "Information processing in man-machine systems," I proposed a model for human information processing: "Physical energy is transduced into neural activity by receptors. This encoded neural activity is transmitted over channels of limited capacity to a 'central processor.' On the basis of the central processor's ability to integrate this information with stored information (the reverberatory circuits and/or information encoded in a nucleic acid chain), a decision is reached which 'attempts' to maintain homeostasis — the existing level of negentropy."

In developing objective measures for the assessment of psychobiological decline, it was my contention that such assessments must be constrained by certain essentials:

1. Cultural and educational bias should be minimal. Test performance should reflect a "biological intelligence," rather than the results of academic opportunity.

2. Tests or techniques should be capable of detecting changes in level or rate of information processing associated with aging or with structural changes in the nervous system. A test or technique which could not reflect such profound changes as occur with neurosurgical procedures or altered states of consciousness with anesthessia could not be expected to reflect more subtle alterations in the information exchange between the cerebral cortex and sub-cortical centers.

3. The information processing task loads of the subsets of an examination system should have a demonstrable association with bio-electrical and/or bio-chemical activity.

4. Task loads for subtests should be defined, and test items for each definition should be of equivalent task loading.

5. The correlation between baseline and retest performances should be at a level sufficient for the construction of estimating equations which will predict retest from baseline performance.

6. The correlation between baseline and retest performances should be at a level sufficient to use standard residual values to report shifts from baseline performance at specified time intervals.

7. Performance on the tests or techniques should have a demonstrable association with external criteria, for examples job performance, control of a man-machine system, certain DSM-III classifications, and etc.

8. Tests or techniques should be sufficiently interesting to maintain the subject's level of attention, should not be unduly fatiguing, and should not be so difficult as to be discouraging.

9. The examination should be capable of being integrated with other information subsets such as the "Cooperative Action" model of Adey and John (a hypothetical overall pattern of electromagnetic waves by sensory stimuli which resonate with patterns previously stored in memory).

Accepting such constraints, my efforts to develop objective measures for the assessment of psychobiological decline led to an information system, PRIME, which I first reported in 1973. PRIME consisted of a series of tasks designed to assess the information exchange between the cerebral cortex and certain sub-cortical centers in the nervous system.

PRIME data were collected and analyzed for many classes of individuals (see Addendum A), and of varying ages (see Addendum B). The collected and analyzed data were validated by external criteria; a 1977 paper "A neurophysiological approach to pilot selection" covered one performance validation of

PRIME. Addendum C presents a comparison of PRIME with W.A.I.S. and with the Halstead-Reitan tests.

Certain test performances have been used to predict gradings of flying proficiency made by simulator instructors. From the performances on level and rate of information processing, several estimating equations are solved. The steps are as follows:

1. A mean performance for a particular age can be predicted from the following equation (where Y is a test performance raw score):

$$Y = 24.53 + (0.41 \times AGE)$$

2. Using a data-base of some thousands of subjects, the raw score Y is converted to a standard score Z by the following equation:

$$Z = -0.45 + (0.10 \times Y)$$

3. The standard score Z predicts the simulator score, S:

$$S = 74 - (4 \times Z)$$

Each subtest of PRIME yields a standard score. The hierarchial position of each subtest determines the weighting each subtest carries in a polynomial which has been shown to predict routine flying proficiency. The agreement between predicted and observed routine flying performance (based on a simulator check for pilot applicants used by several commercial airlines) is shown in Table 1.

TABLE 1
OBSERVED SIMULATOR PERFORMANCE
(CP Air and National)

		> 59	< 60
PREDICTED SIMULATOR PERFORMANCE	> 59	A 71	B 8
	< 60	C 6	D 4

Chi square	5.58212
Degrees of freedom	1
Probability of chance	0.0173

Yates' correction for continuity was applied.

The polynomial has also been shown to discriminate between endogenous and non-endogenous affective disorders in a paper, "Neurophysiological dysfunctions in unipolar non-psychotic major depressions," Rush et al, 1983, copy enclosed.

In the "addendum" to the "Thousand Aviator Study" I hypothesized there would be no significant difference between the means of the performance of one group of pilots ages 60 to 64 years, and another group of pilots beyond 64 years of age. Testing the hypothesis with Student's t, it was accepted; there was no difference, but the older group was superior (if not significantly) to the younger! The findings are summarized in Tables 2 and 3.

TABLE 2

	AGES 60 - 64		AGES BEYOND 64	
Subtest	Mean	S.D.	Mean	S.D.
SCN	18.24	1.97	18.18	2.07
TMT	42.18	11.02	50.41	15.38
SPN	14.76	2.77	15.65	3.10
FIV,S	47.39	9.86	45.76	7.39
FIV,E	1.52	3.09	0.59	0.94
MTS	48.03	21.57	49.59	16.20
G.D.	3.30	0.80	2.67	1.44

TABLE 3

Subtest	t	p
SCN	0.11	ns
TMT	-2.18	ns
SPN	-1.03	ns
FIV,S	0.60	ns
FIV,E	1.20	ns
MTS	-0.26	ns
G.D.	1.99	ns

This, of course, was a too small, too highly selected sample but it was yet another instance of the finding in all of our investigations of performance of the older person (pilot, executive, or neighbor). There are always greater variations between the members of an age group than there are variations between the groups. Although each person may be a member of a group (racial ethnic, sexual, or age), he is firstly unique to himself. There will always be an individual woman who is more intelligent than an individual man; one member of a racial group who runs faster than one member of another racial group; and one 73 year old more alert than one 41 year old.

If I make only one plea, it is that governments and regulatory bodies (and some remiss scientists) look at each person as a unique creation. Only bigots treat all members of any group the same way. The bigotry of an "Age 60 rule" cannot be tolerated.

ADDENDUM A

In round numbers, the data base for PRIME in 1983 was as follows:

CLASSIFICATION	NUMBER
Commercial pilots	10,200
Middle and upper managers, banking and finance	5,650
NFL/AFL players and draft candidates	4,300
Commercial flight attendants	4,000
Middle and upper managers, service organizations	650
Subjects of psychopharmacologic studies (ethical drugs)	500
Subjects of psychopharmacoligic studies (drug abusing)	500
Engineering personnel	375
Commercial pilots, grounded for alcohol abuse	325
Commercial flight engineers	275
Commercial flight mechanics	250
Patients referred for psychiatric screening	150
Helicopter pilots	100
Patients referred for neuro-psychological workup	100
Geologists/geophysicists	100
Surgical patients referred for recovery management	55
Patients referred by medical/legal workup	50
Patients in iron-lungs, effect of anoxia	50
Patients referred for cardiovascular stress management	50
D.W.I. subjects, correlated with blood alcohol	50
US Army Medical volunteers, effect of altered consciousness	50
Corporate pilots	40
Graduate psychology students	20
Neurosurgical residents	10

ADDENDUM B

The data base for PRIME in 1981, separated by age, was as follows:

AGE	NUMBER
15 - 19	921
20 - 24	3,315
25 - 29	5,082
30 - 34	5,234
35 - 39	1,233
40 - 44	759
45 - 49	466
50 - 54	204
55 - 59	161
60 - 64	156
65 - 69	75
70 - 74	35
above 74	20

12-12-85, 9:00 AM
NOTES: D. B. Vinson, Ph.D.
page 9

ADDENDUM C

A comparison of the W.A.I.S. and the Halstead-Reitan Battery with the subtests of PRIME.

	A	B	C	D	E	F	G	H	I	J	K	L	M
PRIME, Scans	X			X	X	X	X	X	X	X	X	X	10
PRIME, Partington Pathways	X			X	X	X		X		X	X	X	05
PRIME, Spans	X			X	X	X	X	X	X	X	X	X	10
PRIME, Visual filtering	X			X	X	X	X	X	X	X	X	X	10
PRIME, Auditory M.T.S.	X			X	X	X	X	X	X	X	X	X	15
PRIME, Visual M.T.S.	X			X	X	X	X	X	X	X	X	X	15
PRIME, Levels aspiration	X			X	X	X		X	X	X	X		05
W.A.I.S.		X		X							X		45
Wechsler Memory Scale				X									15
Halstead, Category	X					X	X						45
Halstead, Tactile	X					X	X						30
Halstead, Trail making	X					X							10
Halstead, Finger tapping	X					X							10
Halstead, Grip Strength	X					X							05
Halstead, Seashore Sounds	X					X							10
Halstead, Seashore Rhythm	X					X							10

LEGEND: A = Minimal cultural bias
B = 8th grade reading level required
C = Performance data must be interpreted intuitively
D = Means and standard deviations exist for each age, 14-65 years
E = Test performance correlates with altered states of consciousness
F = Test performance correlates with symptoms of autonomic and central nervous system
G = Test performance correlates with bio-electrical events, example event-related brain potentials
H = Test performance correlates with bio-chemical events, example blood alcohol
I = Estimating equations predict DSM-III classifications
J = Estimating equations predict test/retest performance
K = Test findings implement FAA, EEOC, NIOSH regulations
L = Estimating equations predict aircraft simulator performance under routine and emergency conditions
M = Administration time, in minutes

Thursday/Jeudi September 8

AUDITORIUM A

SECTION	Hypoxia/Underwater medicine
CHAIRMAN:	J. Hagelsten (Denmark) CO-CHAIRMAN: I. Kuorinka (Finland)
16.00	I.A. Sulg, E. Hokkanen, A. Hollmen et al (Finland) Simultaneous monitoring of quantitative EEG and perfusion pressure in conditions with risk for hypoxia.
16.15	U. I. Balldin, M.H. Linér (Sweden) The preventive effect of a vasodilator on the occurrence of decompression sickness in rabbits.
16.30	H. Löllgen, R. Horres (FRG) Respiratory resistance and ventilatory response to carbon dioxide during head out water immersion.
16.45	S. Sipinen (Finland) Occupational risks in compressed air work in tunnels.
17.00	P. Popovic, V. Popovic and R. Schaffer (USA) Gelatin pretreatment beneficial in experimental decompression sickness.

9th FLOOR 9ème ETAGE
FILM PRESENTATIONS
9.00 – 12.00

Thursday/Jeudi September 8

AUDITORIUM B

SECTION:	Selection of flying personnel
CHAIRMAN:	K. Bergin (U.K.) CO-CHAIRMAN: J. Aho (Finland) [illegible]
9.00	R.L. Dodds (Canada) Medical certification of pilots.
9.15	A. Frykholm (Sweden) Review of traditional medical licensing concepts.
9.30	R. Auffret, J. Timbal (France) Tests spéciaux de sélection des cosmonautes.
9.45	Ö. Tjernström (Sweden) Eustachian tube function and air crew selection.
10.00	K. Antila et al (Finland) One thousand visits of civil pilot candidates in psycho-physiological examination.
10.15	Coffee break
10.45	J. Sinivuo (Finland) Development of pilot selection in Finnish Air Force.
11.00	V. Caeusu, F. Uleu, V. Teodorescu (Roumania) La valeur prédictive de quelques paramètres biologiques pour le succès dans l'apprentissage du vol.

Sat. [illegible]

Thursday/Jeudi September 8

AUDITORIUM B

14.00 – 17.00	PANEL: Pilot selection MODERATOR: G.J. Kidera (USA)
15.30 – 16.00	Coffee break/pause
	D. Rotker (Venezuela) The psychiatric approach to pilot selection
	N. Adam (FRG) The psychological approach to pilot selection
	D.B. Vinson (USA) The neurophysiologic approach to pilot selection
	M. Gardiziella (Finland) Objectives of pilot selection
	A. Trankell (Sweden) Working paper concerning selection of pilots to SAS. Survey of 25 years of selection
	S. Byrén (Sweden) An airline approach to pilot selection.

SAS CONFERENCE.

ENCLOSURE 4

A NEUROPHYSIOLOGIC APPROACH TO PILOT SELECTION

Man's finite ability to transduce physical energy into neural activity appears as a constraint in any man-machine interface. For example, the docking of a space craft, a supertanker, driving a high performance race-car or flying an aircraft.

Dr. Walter's and my presentation of mental time-sharing in the human operator touched on the neurophysiologic approach to pilot selection. I will present a theoretical basis for the model and the testing of the model under conditions of altered staes of consciousness -- and comment on physiologic correlates of information processing. And, finally leave you with the hypothesis that the human operator's ability to input, store, retrieve, compare and output appears to be related to the cost-effectiveness of training and to flying performance.

Integration has been described as a quantum-like concentration of biophysical and biochemical events. Integration antedates the phylogenetic development of the nervous system. For example, protoplasmic structure and functional integration is determined by the dynamic interaction of internal and external factors. As soon as qualitative differences in protoplasmic structures appear, specialized integrating mechanisms begin to organize the living system into a unified whole. The pattern is for reflexes to attain partial autonomy and for higher control mechanisms to unite part activities into whole patterns. The function of the nervous system is the establishment and maintenance of the living system.

The ability of the living system to maintain itself on a low entropy level appears to depend on the capacity to establish and maintain a steady state -- homeostasis. Neural mechanisms, feedback loops, appear to regulate the exchange of information within and between the living system and the internal environment. The action of the brain stem reticular formation appears to influence the general state of excitability of the nervous sytem. The function of the ascending reticular formation is to translate variations in the number of reticular neuroons discharging into the cortex. The function of the descending reticular formation is to translate variations in the intensity of impulses transmitted from the cortex to the brain stem into variations of the number of descending neurons which transmit impulses to the response mechanisms.

The cortex is conceptualized as a three dimensional mosaic, or lattice, of elements essentially identical as to size and functional properties. These functional propterties are taken to be those generally established for neurons — namely, exicitability, refractoriness, conductivity and the potential for spontaneous discharge. It is further assumed that the direction or path of transmission of impulses in the cortex is random.

A model was proposed for human information processing which holds that physical energy is transduced into neural activity by neural transducers . . . receptors. Neural activity is encoded for transmission within the nervous system over channels of limited capacity to a central processor. That is, the cortex is influenced by subcortical centers. On the basis of the central processor's ability to integrate this informacion with stored information, the reverberatory circuits and/or information encoded in a nucleic acid chain, a decision is reached. This decision is then encoded for transmission to an output transducer.

A neural mechanism for computing probabilities and making decisions has been postulated by Walter. During a simple conditioning procedure a surface, negative DC shift from the posterior frontal areas of the brain was recorded. This shift appears to be dependent upon a stimulus induced state of expectancy and has been termed the contingent negative variation or expectancy wave. The CNV appears to prime the frontal lobes for action or decision.

So much for theory. As to the testing of the model under conditions of altered states of consciousness. Since conscious control of action appears to depend on cortical function -- cognitive ability -- as influenced by subcortical, thalamic or hypothalamic activity, certain information processing tasks are used to assess psychobiologic integration.

Psychobiological integration is taken to mean the total, integrated physiological activity of the anatomical unit. The effect of hypoxia on visual filtering -- where filtering is defined as a systemic omission of certain categories of information according to some priority scheme -- has been investigated some years ago with Strughold. Hypoxia was observed to decrease the rate of visual filtering. The effect of sodium pentothal and cyclopropane on the rate of visual search, short-term memory and the ability to shift mental states has been investigated by my colleagues. The effects of information processing on task loads on heart rate, respiration and GSR have also been investigated. As to the physiologic correlates of information processing, heart and respiration rates appear to reflect the subject's involvement with the task of information processing. A physiologic correlate, cardiovascular response, of information processing task loads is reported by Collins and his colleagues. Baseline, in-traffic and sports car racing, records of heart rate were acquired and analyzed as to the load of effective arousal. The findings support the hypothesis that as the the information processing task load increases, the base heart rate increases as a function of CNS arousal.

The effect of information processing task loads on the CNV have been reported by Cohen and Walter. Again, information processing task loadings and/or involvement of the subject with the task appear to be associated with CNS arousal.

How does this relate to pilot selection? Brown holds that performance on a subsidiary task, superimposed on a primary task, provides a measure of spare mental capacity. And perhaps the first atempt to measure spare capacity of man-machine operators, Brown and Poulton superimposed a subsidiary short-term memory task on the primary task of operating a motor vehicle. The spare mental capacity of corporate aircraft operators has been the subject of earlier investigations. The subsidiary task was superimposed on the primary task of instrument flying in a LINK trainer. The subsidiary task consisted of the presentation of a continuous series of digits -- one through nine -- with one missing. The digit spans were presented to the pilot, by tape recording, at the rate of one per second with a five second interval before the presentation of the next span. The number of correct responses was taken to be the measure of the pilot's spare mental capacity. Baseline performances were acquired while the pilots were seated at the controls of the LINK trainer. The subsidiary task of short-term memory was superimposed on the following primary tasks:

1. The maintenance of a given air speed, altitude and constant heading.
2. Maintaining a given air speed, altitude and constant heading, with a cross wind.
3. Maintaining a given air speed, altitude and constant heading, with a cross wind and in rough air.

As the information processing demands of instrument flying increased, the performance on the subsidiary task was seen to degrade. The null hypotheses that the performance on the subsidiary task agree with the instructor gradings of instrument flying proficiency to an extent no greater than chance was tested by calculating the coefficient of ranked correlation. Rho was found to be 0.72, significant beyond the 5% level. These findings were replicated in a study of pilots of Aloha Airlines in both the C-11 instrument trainer and the B-737 aircraft.

The human operator's ability carry out selective attention information storage and retrieval operations appears to be crucial in any man-machine interface. The need for a pilot pre-flight check was expressed at the International Symposium on Aviation Medicine in Guadalajara in 1973. Preflight simulation was rejected as not being feasible and a call was made for the development of a technique which would require the pilot to maintain a relatively constant level of affective arousal, while simultaneously carrying out information exchanges within the nervous system. Such a task has been developed and appears to measure the ability to mentally time-share.

In the computer, or in man, information can be simultaneously input, stored, compared, retrieved, processed and output. In the time-share computer, these inputs and outputs come from and go to various users of the system. Yet, a particular user's inputs, storage, processing and outputs are kept separate by the computer by its ability to time-share, to slice time, in miniscule parts -- serving first one user then another, then another and recycling through the several users. Since the slices of time are so small and the recycling so fast, each user feels he alone controls the computer. He has little or no sense of being only one share among many.

Man must also share or slice his mental computing time. Apparently, he simultaneously inputs from many classes of environment which impinge on him at any moment. Apparently, he simultaneously outputs many classes of behavior. We may speak of doing more than one thing at a time but in actuality each of us does only one thing at a time. We appear to do a multitude of things at a time only because we, too, are time-sharing.

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JORGE J. LAMBRINOS
STAFF DIRECTOR

U.S. House of Representatives

Select Committee on Aging

Washington, D.C. 20515

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PAUL SCHLEGEL
MINORITY STAFF DIRECTOR

February 14, 1985

Mr. Donald Engen
Administrator
Federal Aviation Administration
800 Independence Ave. S. W.
Washington, D. C. 20591

Dear Mr. Engen:

Thank you for the opportunity to meet with you and members of your staff in my office on February 7, 1985 concerning the application of the Federal Aviation Administration's (FAA) "Age 60 Rule" which applies to commercial airline pilots. I believe that the discussion was interesting, candid and offers the opportunity for a constructive dialogue between the FAA and this Committee on an issue which, as I expressed, would appear to represent yet another vestige of age discrimination which should be eliminated from our body of federal law.

As I indicated in our meeting, I would like to obtain from you a detailed explanation of why the chronological age of "60" was established by the FAA to exclude properly licensed and medically competent individuals from continuing to pilot commercial aviation aircraft. As we discussed and as you are aware, the FAA does presently permit individuals age 60 and older to pilot certain catagories of aircraft if they meet the appropriate licensure and medical certification requirements. Moreover, the FAA also presently provides for the recertification for commercial piloting of individuals who have sustained but have appropriately recovered from such medical anomolies as heart attacks and alcoholism. With this background, it is difficult for me to understand your reticence to consider some modification of the Age 60 Rule to permit the continued flight qualification or requalification of pilots age 60 or older who would meet appropriate medical testing standards which could be set by the FAA.

While you indicated that you believed that the Age 60 Rule afforded the FAA a rule of administrative convenience in its regulation of flight standards, it was unclear to me upon what basis this rule afforded such convenience. In this regard, I would like to obtain from you a detailed explanation of the purpose or purposes served by the Age 60 Rule as promulgated and administered by the FAA.

I concur with yours and Dr. Austin's opinion that there is no medical basis for the rule. You stated that the possibility of cardiovascular disease in modern aviation is not the hazard it once seemed to be. You agreed with Dr. Austin and the other medical experts in attendance that medical problems can be detected in individuals with a high degree of accuracy using aviation medical and operational evaluations. You also concurred that training and testing in modern simulators is adequate to evaluate an individual's proficiency. Why, then can you not use those available tests to grant exemptions from the Age 60 Rule to pilots over age 60 whose test results are as good or better than those for a fifty-five year old pilot?

It is important to me to have a clear understanding of your position on these matters. Therefore, it would be helpful if you would be specific in your responses. If I have misstated your position on any of the above matters, I would appreciate a clarification of your position.

Again, my thanks to you for meeting with me on this matter. I would appreciate receiving a response to this inquiry no later than Tuesday, February 26, 1985 in order that we might schedule the subsequent medical and administrative meetings which were discussed at our meeting.

Sincerely,

Edward R. Roybal

Edward R. Roybal
Chairman

ERR:eu

US Department
of Transportation
Federal Aviation
Administration

Office of the Administrator

800 Independence Ave., S.W.
Washington, D.C. 20591

February 25, 1985

The Honorable Edward R. Roybal
Chairman, Select Committee on Aging
House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

Thank you for your letter concerning our recent meeting on the age 60 rule. I, too, believe the discussion was beneficial and would welcome further constructive dialogue between the Federal Aviation Administration (FAA) and your Committee on this issue.

You have requested an explanation as to why the age 60 rule was established. I am enclosing a copy of both our original notice of proposed rulemaking (NPRM) and the final issuance adopting the rule. These two documents provide substantial information, in its proper historical context, concerning why a rule was determined to be necessary and why the agency selected age 60 as the appropriate "cutoff."

In brief, you will note that the explanatory material contained in the NPRM and final rule preamble indicates that studies assessed by the FAA before the rule was adopted clearly indicated that there is a progressive deterioration of certain physiological and psychological functions with age, that significant medical effects attributable to this deterioration occur at an increasing rate with advancing age, and that sudden incapacity due to such medical defects also becomes more frequent as individuals age. Moreover, it was determined that other factors changed with age: the ability to perform highly skilled tasks rapidly; to resist fatigue; to maintain physical stamina; to perform effectively in a complex and stressful environment; and to rapidly apply experience, judgment, and reasoning in new situations. As I indicated in our meeting, the FAA has never hesitated to acknowledge that, while there was and remains a determined need for an age cutoff, the age of 60 was not the only possible age which might have been selected; it was, however, given all the factors discussed in the NPRM and rule preamble, determined to be the most appropriate age.

Let me briefly address those aspects of your letter in which you have sought to restate my views related to the age 60 rule. Your restatement of my thoughts on the medical and performance factors associated with the rule is not quite on target with what I had attempted to express. I regret any misunderstanding which might have occurred during our discussion. Therefore, I would like to elaborate on my views concerning those issues to assure that we have a clear understanding of each other's position.

As to the medical aspects of the rule, there is no question that today our capabilities of assessing an individual's medical condition are greater than they were in 1959. Despite these increases in knowledge and diagnostic capabilities, however, there remain many medical conditions, the onset of which we cannot predict to a sufficient degree to provide an appropriate assurance of safety. Moreover, there continues to be direct evidence that disease and illness do increase dramatically in the population as it approaches and exceeds age 60. Much of the focus of those who argue for changes in the rule has related to improvements in identifying disease of the cardiovascular system, leaving unanswered many questions as to the relevance of other medical and physiologic factors to safe performance of piloting duties.

It is also clear that our ability to monitor an individual's performance in handling an aircraft under a variety of flight conditions has improved substantially because of the advanced flight simulators available today. Nevertheless, a flight simulator cannot detect subtle deteriorations in an individual's capabilities related to advancing age, nor do we have any index of what specific levels of capability (including such factors as applying reasoning to new and changing conditions) are necessary. Yet, there is ample scientific evidence which indicates convincingly that there are a variety of skills which begin to deteriorate in everyone, sometimes in a pronounced manner and sometimes in virtually undetectable and subtle ways, as the result of increasing age. That is the dilemma we face in seeking to assure the safety of the traveling public.

Therefore, notwithstanding the important advances which have occurred over time--and which have been closely monitored by the FAA--in a variety of areas related to the age 60 rule, we are simply not at the point where the rule can be relaxed and still provide an appropriate level of safety. Insofar as exemptions are concerned, it is long-stated FAA policy, and one with which I agree, that, when we know enough to confidently grant exemptions from the age 60 rule, we will instead take appropriate action to change the rule itself so that all may benefit from such a change.

I trust that my letter clarifies the issues we discussed at our meeting, and that it is responsive to your letter to me. You may be assured that we will continue to monitor the advancements in medical science with a view toward changing the age 60 rule whenever we can do so consistent with aviation safety.

Sincerely,

Donald D. Engen
Administrator

Enclosure

EDWARD R. ROYBAL, CALIF.
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MINORITY STAFF DIRECTOR

March 20, 1985

Mr. Donald Engen
Administrator
Federal Aviation Administration
800 Independence Ave. S. W.
Washington, D. C. 20591

Dear Mr. Engen:

Thank you for your letter of February 25, 1985. In view of the meeting held in my office on February 7, 1985, I am somewhat disconcerted by your letter. It was as though we had attended different meetings on February 7th.

Having heard you say on February 7, 1985, that you were not concerned by the threat of cardiovascular incapacitations, and Dr. Austin agreeing with the doctors present that there are tests which can determine the physical fitness of pilots over age 60, I was surprised to read your comments.

In your letter, you stated you were enclosing a copy of both the original notice of proposed rule making (NPRM) and the final issuance adopting the age 60 rule. In reality, the enclosures were a copy of the advance notice of proposed rule making (ANPRM) issued by the Federal Aviation Administration (FAA) on July 8, 1982, and a copy of crewmember requirements as issued on December 31, 1964. Unfortunately, these documents do not provide the information to which you refer.

In your letter of February 25, 1985 you make reference to "...many medial conditions, the onset of which we cannot predict to a sufficient degree to provide an appropriate assurance of safety." Both at our meeting and in your letter of February 25, you were not specific as to those medical or other conditions which are of concern to you and the FAA. I would like to obtain from you a detailed listing of those conditions to which you refer or the FAA has idendified which cannot be predicted or diagnosed and which would jeopardize flight safety if not discovered by appropriate tests of individuals age 60 or older. I would like to obtain an explanation of the medical or other basis upon which the FAA has determined that medical or other testing cannot predict a sufficient safety margin for these conditions for the certification of commercial airline pilots age 60 or older. I would like to obtain an explanation as to whether the conditions to which you allude are prevalent in the overall population below age 60 or are confined to or are more prevalent among persons age 60 or older and any other medical, scientific or other information which forms the basis of the FAA conclusion that medical, psychological or simulator testing cannot adequately detect and predict the occurence of these conditions in a manner to adequately assure flight safety.

Mr. Donald Engen
March 20, 1985
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You indicate further that with respect to the use of a flight simulator that such a simulator "...cannot detect subtle deteriorations in an individuals capabilities related to advancing age, nor do we have any index of what specific levels of capability (including such factors as applying reasoning to new and changing conditions) are necessary".

These and similar statements contained in your letter seem to beg the question at hand and upon which public policy should be formed, that is whether there are acceptable tests upon which the FAA may rely to determine whether an individual may be certified for commerical airline piloting. Obviously, such testing is presently utilized for those commercial airline pilots below age 60 who are certified by the FAA. Equally clear, medical knowledge and testing have advanced to sufficient degrees that a number of disqualifying conditions which result in the termination of a pilots license (alcoholism, heart failure, etc.) need not represent a permanent disqualification from flight certification. The FAA has provided for the retesting of such individual's and, where appropriate, has recertified a number of those individuals who have adequately demonstrated their fitness to continue their flight duties.

I must confess that the reference to inspecific conditions to which you allude in your letter is most disturbing in light of the present retesting programs presently afforded by the FAA. The FAA's reticence to provide for some appropriate exemption procedure from the Age 60 Rule must be measured in light of present medical knowledge and the testing programs already utilized by the FAA for disqualifying conditions. As you are aware, in 1979, legislation was passed which mandated a study of the Age 60 Rule. The National Institute of Aging Panel supported by the National Academy of Sciences Institute of Medicine, conducted a complete review of all existing scientific data and issued a report in 1982 which found no medical or scientific basis for the mandatory retirement of airline pilots at age 60 or any other specific age. The panel recommended retaining the rule until procedures to change it could be implemented.

Again, it is not clear to me from your letter whether the FAA has undertaken to implement such a procedure. I would like to obtain from you an explanation as to the steps undertaken by the FAA since the issuance of the Panel's findings to implement such a procedure or, reasons, in specific, as to why the FAA has not pursued this recommendation.

In closing, I would like to indicate my personal concern that your letter of February 25, does not appear to be responsive to my request of February 14, 1985. Specifically, I asked in pertinent part that, "I would like to obtain from you a detailed explanation of the purpose or purposes served by the Age 60 Rule as promulgated and administered by the FAA."

Mr. Donald Engen
March 20, 1985
Page Three

The materials which you previously enclosed are not responsive to that request in light of the subsequent findings of the 1982 Panel. Moreover, the historical age of the materials enclosed with your letter seem to suggest that the FAA has not reexamined the basis and policy of this Rule from its inception. Medical knowledge, testing and testing procedures and the medical histories of a number of pilots who have been determined to be physically and mentally fit to continue their flight duties, but for the impediment of the Age 60 Rule, should be recognized by the FAA. For this reason, I reinterate my earlier request and ask to that you evaluate your response in light of that Panel's findings and the adequacy of testing, both medical, psychological and by simulator, which is available to assure adequate passenger safety.

Sincerely,

Edward R. Roybal

Edward R. Roybal
Chairman

ERR:eu

US Department
of Transportation
**Federal Aviation
Administration**

Office of the Administrator

800 Independence Ave., S.W.
Washington, D.C. 20591

APR 26 1985

The Honorable Edward R. Roybal
Chairman, Select Committee on Aging
House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

This is in reply to your letter of March 20 which seeks further information from the FAA concerning the age 60 rule. I am pleased to respond to the issues you have raised in your letter.

Among other things, you have asked the FAA to specify those conditions that the FAA has identified "which cannot be predicted or diagnosed and which would jeopardize flight safety if not discovered...." Actually, my original response to you indicated that there are many "medical conditions, the onset of which we cannot predict to a sufficient degree to provide an appropriate assurance of safety." (Emphasis added.) Therefore, what is significant is not that there may be some means of predicting or diagnosing some of these conditions, but that for many of these potentially threatening conditions there are substantial limitations associated with the accuracy or practicability of the methods available to make such predictions or diagnoses. You have asked me to specify conditions for which we believe the ability to predict or detect their occurrence is limited by the current state of medical science. Some examples of such conditions are: neoplastic diseases of various body organs; ischemic cerebrovascular disease; cerebrovascular conditions that lead to cerebral hemorrhage and subarachnoid hemorrhage; Parkinson's disease; dementia; endocrine disorders, including disorders of the thyroid and pancreas; and cardiovascular disease, including disease of the coronary arteries and peripheral vascular system. The frequency of these disorders increases with age.

There are a variety of other conditions which typically increase in severity or are aggravated by age, and which, because of their often subtle nature, do not necessarily lend themselves to detection. Even if such subtle changes were detected, there is no validated way to relate such information to the specific level of capabilities needed to safely pilot a commercial aircraft. Examples of these conditions are: decreased dynamic visual acuity and acuity under low illumination; diminished visual accommodation and field; a slowing in the ability to process and respond to information;

and altered speed, capacity or accuracy associated with various aspects of attention, psychomotor performance, memory, and problem-solving ability.

There are varying degrees to which we can predict or diagnose the existence of the kinds of conditions and disorders I have enumerated above. Some of these conditions, of course, are more serious than others from a safety perspective. Moreover, there are different degrees to which different individuals may be afflicted by such disorders. Although conditions such as I have mentioned may be found at any age, the frequency of such disorders does increase with age.

We continually seek to remain abreast of advances in medical science and to be generally familiar with the accuracy and availability of various testing methods to identify underlying disease processes and functional deficiencies. As I have indicated, there exists no practical testing methodology for a variety of conditions which may affect aging pilots. This view was confirmed by the National Institute on Aging (NIA) Panel on the Experienced Pilots Study. This Panel concluded that age-related changes in health and performance influence adversely the ability of an increasing number of individuals to perform as pilots with the highest degree of safety and, consequently, could endanger the safety of the aviation system as a whole. Moreover, the Panel could not identify the existence of a medical or performance appraisal system that can single out those pilots who would pose the greatest hazard because of early or impending deterioration in health or performance. This is a very significant conclusion which, in our view, cannot easily be dismissed nor should it be.

After the NIA report was issued, in keeping with the report's recommendations, the FAA issued an Advance Notice of Proposed Rulemaking (ANPRM) on June 23, 1982, which sought comments on a plan that would allow air carrier pilots to voluntarily enter a program for collection of medical and performance data that might form a basis for relaxation of the age 60 rule. After the review of public comments on this proposal, the FAA withdrew the ANPRM on March 20, 1984, because, it was determined that, in the absence of validly selective tests, there are not sufficient means of collecting quantitative medical and performance data on airline pilots under conditions of actual operational stress and fatigue that do not introduce an unacceptable safety risk.

The Panel's findings, together with our assessment of the comments received in response to the ANPRM and our continued review of the scientific literature, persuade us that the age 60 rule should not be changed at this time. Since the purpose of this rule is to assure that air carriers are providing their services consistent with the highest degree of safety, we intend to make no changes to the rule until we are confident that the safety of the American traveling public would not be jeopardized. We simply have no basis for such confidence at this time, but we will continue to monitor advancements in science in order to initiate appropriate changes to the rule when they are warranted.

I am enclosing a copy of the original NPRM that proposed the establishment of the age 60 rule, the issuance incorporating the final rule, and the withdrawal of the recent ANPRM I have mentioned. I trust this is responsive to your inquiry.

Sincerely,

Don Engen

Donald D. Engen
Administrator

Enclosures

AN EXAMINATION OF THE CONDITIONS LISTED BY FAA ADMINISTRATOR ENGEN IN HIS LETTER OF APRIL 26, 1985

Airline pilots have been disqualified or denied medical certification for many reasons. The principle cause for such disqualification is cardiovascular disease. Many of the conditions and disorders the Administrator listed are rare and very slow progressing. There have been few denials and disqualifications for most of those listed conditions. Many airline pilots who have suffered one or more of the listed conditions are currently flying with full medical certification.

From January 1961 through December 31, 1980, the FAA had recertified or granted special issuance certificates to 462 airline pilots who have suffered disqualifying conditions. There were:

74 for myocardial infarction with 22 relapses (29.7%).
12 for coronary artery by-pass graft surgery with 2 relapses (16.7%).
42 for miscellaneous medical conditions, including nervous disorders, coronary heart disease, psychoses, angina pectoris, aneurism, drug dependence, etc, with 7 relapses (17%).
365 for alcoholism with 67 relapses (18.4%).

From January 1982 through July 1985, the FAA has granted 414 more exemptions or special issuance certificates. These include:

50 for coronary artery by-pass graft surgery;
293 for alcoholism;
20 for myocardial infarctions;
18 for neurological conditions;
14 for psychiatric conditions;
17 for other cardiovascular conditions; and
2 for miscellaneous conditions.

Following are the conditions or disorders to which Administrator Engen referred in his letter of April 26, 1985, and an explanation of the condition/disorder.

"NEOPLASTIC DISEASES OF VARIOUS BODY ORGANS"

The "various body organs" were not identified by the Administrator.

A "neoplasm" is described as a new growth; tumor; abnormal tissue that grows by cellular proliferation more rapidly than normal (an example is cancer). The mass it forms is either benign or malignant.

"ISCHEMIC CEREBROVASCULAR DISEASE"

"Ischemia" deals with anemia due to mechanical obstruction (mainly arterial narrowing) of the blood supply.

"Cerebrovascular disease" relates to diseases of the blood supply to the brain.

"Ischemic cerebrovascular disease" is usually characterized by atherosclerotic (irregular distribution of fatty deposits in the inner portions of large and medium sized arteries) changes in the cerebral (brain) vessels (NIA Report F-100).

"Hypertension" (high blood pressure) leads to changes in blood vessel walls and is the most definite risk factor in ischemic cerebrovascular disease (NIA Report F-100).

"CEREBROVASCULAR CONDITIONS THAT LEAD TO CEREBRAL HEMORRHAGE AND SUBARACHNOID HEMORRHAGE"

"Cerebral (brain) hemorrhage" implies a hemorrhage in the cerebellum, the large posterior brain mass lying above the pons and medella and beneath the posterior portion of the brain.

"Cerebral Hemorrhage" is less frequent than **ischemic cerebrovascular disease.** It has multiple causes, the most common by far associated with **hypertension** (NIA Report F-100)

"Subarachnoid hemorrhage" is bleeding into the brain. The **"arachynoid"** is a weblike membrane which forms the middle layer of the covering of the brain and spinal cord.

Because most aneurysms (circumscribed dilation of an artery) and all arterio-venus malfunctions are thought to be related to the original formation of the vessels, it is not surprising that cataclysmic events are likely to be seen in young and middle aged adults (NIA Report F-103).

"Hemorrhage" is likely to occur in older persons, but the correlation with **hypertension** is more important than with age (NIA Report F-103).

"Hypertension" is considered the most common cause of **cerebrovascular disease** and **cerebral hemorrhage.** Under the FAA's medical certification system, a pilot may have blood pressure ranging from 140 mm/hg (systolic) over 88 mm/hg (diastolic) in the twenties, to 145 mm/hg over 92 mm/hg in the thirties, to 155 mm/hg over 96 mm/hg in the forties, to 160 mm/hg over 98 mm/hg in the fifties. These readings may be increased upward 10 mm/hg for the systolic readings and upward 6, 4, and 2 mm/hg for the diastolic readings in the three highest age groups, if the applicant's cardiac and kidney conditions, "after complete cardiovascular examination, are found to be normal" **(FAA's Guide for Aviation Medical Examiners).**

"Systolic Blood Pressure" of 140 mm/hg is considered bordering **hypertension.** Systolic blood pressure of 160 mm/hg (at any age) is considered definite **hypertension. ("Hypertension and Hypertensive Heart Disease in Adults". Gordon and Devine). The American Heart Association** considers systolic blood pressure to be normal if it is under 120 mm/hg. Over 150 mm/hg, the heart attack risk doubles and stroke risk quadruples.

"Hypertension" commonly referred to as **"high blood pressure**, leads to changes in blood vessel walls. This leads in turn to weakness of those walls and a tendency to rupture (NIA Report F-100).

For the issuance of a First-Class Medical Certificate, the FAA, in its **"Guide for Aviation Medical Examiners"**, states:

> "Unless the adjusted maximum readings apply, the applicant's reclining blood pressure may not be more than the maximum reading for his age group in the following table:

AGE GROUP	MAXIMUM READINGS (RECLINING BLOOD PRESSURE IN MM OF MERCURY)		ADJUSTED MAXIMUM READINGS (RECLINING BLOOD PRESSURE IN MM OF MERCURY) 1/	
	SYSTOLIC	DIASTOLIC	SYSTOLIC	DIASTOLIC
20-29	140	88	-	-
30-39	145	92	155	98
40-49	155	96	165	100
50-59	160	98	170	100

1/ For an applicant at least thirty years of age whose reclining blood pressure is more than the maximum reading for his age group and whose cardiac and kidney conditions, after complete cardiovascular examinations, are found to be normal.

"PARKINSON'S DISEASE"

"Parkinson's Disease" is a shaking or trembling palsy; a neurotic syndrome usually resulting from arteriosclotic (thickening and hardening of the arteries) changes in the basal ganglia (all of the large mass of gray matter at the base of the cerebral hemisphere), and characterized by rhythmical muscle tremors, rigidity of movement, festations (acceleration of gait), droopy posture, and masklike facies (dealing with the face, surface, or expression).

Symptoms of **"Parkinson's Disease"** include general motor slowness, tremor at rest, increasing tone, increased salivation, and oiliness of the skin. Work performance would likely be affected by motor disturbance (slowness of response) and early **dementia** (impaired memory) (NIA Report F-102).

The diagnosis of **"Parkinson's Disease"** in the well established case can be made on clinical examination (NIA Report F-102). Close observation of a patient suspected of **"Parkinson's Disease"** is so effective that the need for further testing is minimal. In its overt symptomatic stage, **"Parkinson's Disease"** is readily diagnosed. Long before tremor, premonitory signs appear and are easily recognized by an alert physician. Mental processes are not affected by **"Parkinson's Disease"** and the annual incidence is about .02% (Hospital Practice, July 1981).

"DEMENTIA"

"Dementia" is general mental deterioration due to organic or psychological factors. **Dementia** refers to the loss of higher intellectual capacity. It is also called **"brain syndrome"**.

Loss of memory, abstract conceptualization, orientation, judgment, and other higher-level capabilities are characteristic.

Generally it is caused by many underlying diseases, including endocrine (internal secretions), metabolic (tissue change), nutritional (taking in and assimilation of materials), toxic (poisonous substance that is formed as part of a cell), neoplastic (new growth, tumor, cancer), infections, traumatic (related to a disease of unknown cause), degenerative and generally degenerative diseases
(NIA Report F-102).

"ENDOCRINE DISORDERS, INCLUDING DISORDERS OF THE THYROID AND PANCREAS"

"Endocrine" deals with internal secretions and the glands that furnish those secretions.

To detect **"endocrine disorders"**, the FAA does not require any special equipment. A protocol for examinations applicable to endocrine disorders is not provided for **Aviation Medical Examiners (AME's)** since history taking, observations, and other systems have already revealed much of what can be known about the status of the applicant's endocrine system, i.e., the examination of the skin can reveal important signs of **thyroid** disfunction. The eye may reflect **thyroid** disorder or **diabetes** **(FAA's Guide for Aviation Medical Examiners).**

Identification of **endocrine**, renal, pulmonary, hematologic, or gastrointestinal disorders would not necessarily be means of discontinuing certification except in selected cases (NIA Report F-82).

"THYROID"

The **"thyroid"** is a ductless gland lying in front of and to the side of the upper tracia.

The FAA regulations require an examination of the head, face, neck, and scalp as well as recording pulses in order to determine **thyroid disease** (NIA Report F-84).

"**Hyperthyroidism**" is an abnormality of the **thyroid's** regulatory system in which there is an unusual increase in the **thyroid's** secretions. this condition is less prevalence in older persons (NIA Report F-84).

"**Hypothyroidism**" is diminished production of the **thyroid** hormone usually leading to myxedema (dryness and loss of hair, subnormal temperature, hoarseness, and muscle weakness) and cretinism (hypothyroid dwarfism. This condition is more prominent in women and its symptoms are easily recognized (NIA Report F-84).

The FAA's Guide to AME's recommends specific tests to confirm the diagnoses and severity of **thyroid** disorders (NIA Report F-84).

Measurement of serum thyroxine is the best single test for screening of occulet (hidden or secret) **thyroid** disease (NIA Report F-85).

"PANCREAS"

The "**pancreas**" is a ductless gland connected to the doudenum at one end and the spleen at the other. It secretes juices, particularly insulin (the hormone that promotes glucose utilization) and glucagon into the intestines.

Two conditions associated with the "**pancreas**" are, "**hypo-glycemia**" (low blood sugar), and "**hyper-glycemia**" **(high blood sugar).**

The incidence of "**hypo-glycemia**" is so small that it does not warrant any special screening (NIA Report F-82).

"**Hyper-glycemia**" would manifest itself by obvious symptoms and signs of serious illness (NIA Report F-82).

Other **"ENDOCRINE DISORDERS"** are:

"DIABETES AND GLUCOSE INTOLERANCE"

"DIABETES"

Diabetes is caused by an absolute and relative insufficiency of insulin (Nia Report F-83).

Diabetes which cannot be controlled by diet and exercise alone is a disqualifying condition. A history of **diabetes** that no longer requires medication for control is not, in itself, disqualifying **(FAA's Guide for AME's)**

The most common form of **diabetes mellitus** is that which does not requires insulin and is controlled by diet and exercise (NIA Report F-83).

Obesity is present in 80% of persons who have **diabetes mellitus** (NIA Report F-82).

If **diabetes** is suggested by the pilot's medical history or physical examination, or by sugar in the urine, a diagnostic tolerance test is outlined in the FAA's **Guide for AME's** (NIA Report F-83).

The prevalence of **diabetes** is greater among women at all ages over age 17 (NIA Report F-83).

GLUCOSE INTOLERANCE

Glucose intolerance is a declining ability to dispose of a standard load of sugar (NIA Report F-83).

Glucose tolerance decline is highly associated with obesity and is caused, in part, by an increased percentage of fatty tissue and a decline in muscle tissue (NIA Report F-83).

Standards have been developed to differentiate **diabetes** from normal glucose tolerance changes with age (NIA Report F-83).

A blood glucose determination is not a routine part of the FAA's medical evaluation for any class of medical certificate. However, the examination does include a routine urinalysis (**FAA's Guide for AME's** Page 37).

"CARDIOVASCULAR DISEASE, INCLUDING DISEASES OF THE CORONARY ARTERIES AND PERIPHERAL VASCULAR SYSTEM"

Cardiovascular" relates to the heart and the blood vessels or the circulation.

The only equipment required for an AME to conduct a medical examination of a pilot's chest and lungs, his heart and **vascular system** is an examination table and a good stethoscope (**FAA's Guide for AME's** Page 28).

Myocardial infarction and angina pectoris are disqualifying conditions for a first class medical certificate. Through December 1980, first class certifications were granted to 25 pilots who had suffered myocardial infarctions and to 5 who had angina pectoris. From January 1982 through July 1985, twenty more pilots who had suffered myocardial infarctions were recertified and returned to full flight status.

There is a gradual decrease in cardiac function with age (the passage of time), but in the absence of **cardiovascular disease**, the decrement is sufficiently small that no significant effect on pilot performance would be likely (NIA Report P-71).

Cardiovascular problems influencing pilot performance in multi-crew airlines were reviewed in 1975 by the **Eighth Bethesda Conference of the American College of Cardiology.** This conference made recommendations regarding identification and evaluation of pilots with **ischemic heart disease, cerebrovascular disease, hypertension, valvular heart disease, congenital heart disease, myocardial-pericardial disease, and arhythmias** (NIA Report F-71).

Modern medical technology provides means to detect those at higher risk of such events (major cardial arhythmias) whether or not they have symptoms (NIA Report F-72).

There is no agreement on what constitutes an unnecessary high level of coronary disease in pilots, but implicit estimates can be adduced from current regulations:

1. The FAA excludes from pilot licensure persons with a history of previous myocardial infarction (Such persons have an annual mortality rate of 4%).
2. The Civil Aviation Medical Division of Canada estimates that there is a 3% annual mortality rate for persons who have already experienced a cardiovascular event, and argues that this should be the upper limit (NIA Report F-74).

Screening tests for latent cardiac disease have been developed and improved. Their sensitivity are generally known and tests are very reproducible (NIA Report F-76).

There have been many epidemiologic studies bearing on the prediction of risk associated with cardiovascular disease in asymptomatic persons. ....airline pilots remain at somewhat lower risk from age 30 through age 60. ....Data from the general population could be used as a basis for estimates of group risk (for pilots) (NIA Report F-75).

Strategies for non-invasive detection of coronary disease have been developed (NIA Report F-75).

"DISEASES OF THE CORONARY ARTERIES"

"Coronary arteries" are the arteries which supply blood to the heart muscle, itself. One disease which attacks these arteries is arteriosclerosis (hardening of these arteries).

Diseases of the heart muscle and its performance are not the same as diseases of the coronary arteries. Certainly, if the coronary arteries become diseased or occluded, the heart muscle will be adversely affected, but generally speaking, coronary heart disease and diseases of the coronary arteries are not synonimous.

"MYOCARDIAL INFARCTION"

The myocardium is the middle layer of the heart, consisting of cardiac (heart) muscle. An infarction is a sudden insufficiency of arterial or venous blood supply due to a blockage.

"DISEASES OF THE PERIPHERAL VASCULAR SYSTEM"

The **"peripheral vascular system"** relates to the small blood vessels of the outer parts of the body as opposed to the blood vessels and arteries of the central r inner parts.

Diseases of the **peripheral vascular system** are: -

1. **Arteriosclerotic vascular disease** with evidence of circulatory obstruction;
2. **Bueger's disease** (inflammation of blood vessel walls and tissue in the legs of young and middle aged men and usually leading to gangreen);
3. **Intermittent Claudication** (caused by ischemia of the muscles and characterized by lameness and limping);
4. **Raynaud's disease** (spasm of the digital arteries with numbness in the fingers);
5. **Thrombophlebitis** (venous inflammation with clot formation); and
6. **Syncope** (sudden fall in blood pressure).

Arteriosclerotic **vascular disease** when mild, presents no impediment to medical certification (**FAA's Guide for AME's**).

"DECREASED DYNAMIC VISUAL ACUITY AND ACUITY UNDER LOW ILLUMINATION"

"Dynamic visual acuity"

Dynamics is the science of motion in response to forces; that branch of mechanics that deals with forces and their relation primarily to the motion of bodies.

Dynamic - means of or relating to physical force or energy; marked by continuous productive activity.

Acuity - sharpness; clearness; distinctness.

Visual acuity - clarity of central vision; the relative ability of the eye to resolve detail.

Dynamic visual acuity could be described as an index of the ability to discriminate detail in finely patterned moving targets.

The iris of the eye opens and closes with decreases and increases in light so as to provide the smallest pupil opening at the prevailing light level. The decline in pupil size does not contribute significantly to the decline in speed of visual perception in older persons. (NIA Report F-121)

The prevalence of cataracts (lens transparency that seriously impairs vision) in older persons is not high; 9% among those 60 - 69 and 18% among those 70 - 79 years of age. (NIA Report F-122)

"Acuity under low illumination"

Changes in the latent period (speed of response) of the optical nerve occur only in illumination fluctuations of a thousand-fold or more. (NIA Report F-121)

Dr. Jascek Szafran, in his study of airline, military and test pilots, conducted for the U. S. Public Health Service in the mid to late 1960's, stated, "As an occupational group, pilots are better observers and consequently are able to extract information more efficiently even at very low levels of signal to noise ratios (signal in this case is the visual or aural information and noise is the surrounding background or irrelevant information).

Szafran further stated that the reduction in signal to noise ratio is in the order of 25% in pilots under age 40 as compared to 20% in those over age 40. This trend, according to Szafran, is in line with other findings which support that diverted attention away from a high information signal is likely to produce an effect resembling a reduction in its intensity.

"DIMINISHED VISUAL ACCOMMODATION AND FIELD"

"Visual accommodation"

Visual accommodation - the ability of the crystalline (transparent) lens to change shape to bring near objects into focus. The crystalline lens grows throughout life, adding a stratum (layer of tissue) every four years. This leads both to hardening and yellowing of the lens (NIA Report F-121).

The absolute level of accommodative power is somewhat higher in pilots. This refractive (the deflection of a ray of light as it passes a lens) loss (in accommodative power) can be compensated for, for the most part, by the use of bifocal lenses (NIA Report F-121).

Dr. Szafran analyzed "intrinsic" (internal; inherent; inborn) attributes "essential to flying" (such as high speed decision-making, the detection of low intensity - low probability signals, and the ability to assimilate large amounts of information).

He stated, "Although the expected psysiological declines were noted (in **visual accommodation** for instance), performance of older pilots in most instances was compatible to that of younger pilots. (NIA Report F-124). Szafran also stated, "There are suggestions that genetic, dietetic, and climatic factors may be implicit in this condition".

In both auditory and visual discrimination tasks, older pilots tend to select strategies that were optimal for signal detection, negating the overriding limitations incurred by decline in sensory mechanisms, e.g., lens yellowing, declining **visual accommodation**, and presbycusis (loss of ability to perceive or discriminate sounds as part of the aging process). There is also a lack of significant differences with decision-making capabilities across age cohorts
(NIA Report F-124 & F-125).

"Visual field"

Visual field - the area simultaneously visible to one eye without movement.

The loss of **visual field** is most marked past age 65, but the degree of this change is highly variable between individuals. Most of the field is likely to be intact in healthy persons in their seventies. (NIA Report F-122)

Glaucoma - - in which there is reduction in the visual field associated with too high intra-ocular pressure - - increases with age, but is not intrinsic with aging
(NIA Report F-122).

Visual perimetery (measurement of the **visual field**) testing and regular tonometry (measurement of tensions) should be sufficient to detect glaucoma and associated **visual field** problems developing in older persons (NIA Report F-122).

"A Slowing in the Ability to Process and Respond to Information"

In Dr. Szafran's study entitled "Psychophysiological Studies of Aging in Pilots", Dr. Szafran analyzed specific perceptual (the mental process of becoming aware of or recognizing an object) and psychophysiological (a combination of the mental or behavioral and the bodily or vital processes) measures to determine whether significant age differences were reflected in their performance. For almost every measure, the pilot's age (from the late 20's to the early 60's) was irrelevant to performance. (NIA Report F-124)

Szafran concluded that routine aspects of a professional pilot's performance would not be affected by the aging process across normal working life.
(NIA Report F-125)

In the past few years there has been research on the prediction of automobile driving performance according to variables of selective attention, perceptual style, and perceptual motor reaction time. These three variables have been shown to manifest individual differences, to manifest age differences, and to be correlated with automobile accidents. The selective attention measure also has been found to be predictive of pilot proficiency. (NIA Report F-124)

There have been studies conducted on reaction time of various age groups. According to Dr. Spirdoza, persons who remain active into their seventh and eighth decades have reaction times equal to or better than sedentary persons forty years younger. Studies have also shown that reaction time may differ by micro-seconds when performance of younger versus older subjects is measured. Also reaction time actually increases for well practiced maneuvers.

"ALTERED SPEED, CAPACITY OR ACCURACY ASSOCIATED WITH VARIOUS ASPECTS OF ATTENTION, PSYCHOMOTOR PERFORMANCE, MEMORY AND PROBLEM-SOLVING ABILITY"

Presumably, the Administrator is alluding to the statement made by the National Academy of Sciences, Institute of Medicine Panel (IOM) on Page 140 of its report to the National Institute on Aging.

> "Aspects of attention, psychomotor performance, memory and problem-solving ability show altered speed, capacity and accuracy with age."

The IOM Panel went on to say:

> "However, as was noted for perceptual function, there is great variability among individuals. In addition, performance decrements are far less apparent for well practiced skills."

"PSYCHOMOTOR PERFORMANCE"

Psychomotor - Relating to the mental origin of muscular movements, to the production of voluntary movements.

Piloting a plane requires efficient extraction of information from a broad array of relevant and irrelevant stimuli in which it is embedded. There is also a necessity for monitoring many sources of information and focusing attention selectively.

Three variables are important for inclusion in any battery of tests to predict pilot proficiency:

Selective attention - (the ability of a person to extract information efficiently from the array of information available);

Perceptual style - (mental process of becoming aware of opr recognizing objects or information); and

Perceptual motor reaction time - (the time it takes for mental processes to generate impulses to cause muscle fibers to contract. An organism's overt reaction to a stimuli.)

There is a great deal of interest in determining other attributes necessary for piloting an airplane. **See note on the study conducted by Szafran on Pages 13, 14, and 15.**

Once again, to repeat Szafran's conclusions, "....routine aspects of a professional pilot's performance would not be affected by the aging process across a normal working lifespan" (IOM Report P-141).

> Psychomotor slowing with age cannot be attributed to such factors as sensory diminuation alone (IOM Report P-143).
>
> The speed and accuracy of older pilots appears to be highly dependent upon the cardiovascular pulmonary status rather than chronological age (IOM Report P-145).

INTELLIGENCE AND PROBLEM-SOLVING

> Among pilots, there is no correlation between age and intelligence as assessed by the Raven Progressive Matrices (IOM Report P-156).
>
> Pilots as a group appear to have above-average intelligence (IOM Report P-156).

APPENDIX 2

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

National Institutes of Health
Bethesda, Maryland ~~20205~~ 20892
Building 31
Room 2C02
(301) 496-9265

December 19, 198[illegible]

The Honorable Matthew Rinaldo
House Select Committee on Aging
House of Representatives
Washington, D.C. 20515

Dear Mr. Rinaldo:

During the hearing on airline pilot retirement held by the Select Committee on October 17, it was agreed that Dr. Samuel N. Fox, III, Dr. Jefferson M. Koonce, and I would develop an examination protocol which might substitute for the Federal Aviation Administration's (FAA) Age 60 rule.

The attached protocol is our combined response to that request. It is based on the Report of the National Institute on Aging (NIA) Panel on the Experienced Pilots Study and subsequent additional research related to human performance beyond age 60, as presented at the hearing on October 17. The proposed protocol would provide for testing commercial airline pilots for continuation of pilot status beyond age 60.

While the Report of the NIA Panel on the Experienced Pilots Study of August 1981 concluded that, despite no convincing medical evidence for pilot retirement at age 60, the present rule should stand because of inadequate data to support a change, it also recommended that, "an approach to changing the age 60 rule," should be undertaken (pp. 22-25 of that report). In the intervening years since 1981, further research has documented the maintenance of good health and functioning in many persons well beyond the age of 60, and has documented the predictive value of certain tests.

Drs. Fox, Koonce, and I have based the enclosed protocol on the previous recommendation and the more recent research findings, and are submitting it for discussion and comment by the FAA as requested by you and Mr. Roybal.

Sincerely yours,

T Franklin Williams

T. Franklin Williams, M.D.
Director
National Institute on Aging

Enclosure

December 19, 1985

Proposed Examination Protocol for Airline Pilots Age 60 and Above

This proposed protocol is designed to provide, for any pilot affected by the present age 60 rule who wishes to continue as a pilot beyond age 59, a comprehensive examination of health status and performance ability which should establish his/her continued qualification. The protocol may provide the additional benefit of creating data that can subsequently be used as a basis for further modification of rules regarding such pilots.

Any pilot subject to the age 60 rule who wishes to continue as a pilot beyond age 59 would undergo the following comprehensive medical evaluation and evaluation of performance.

The medical evaluation protocol should include the following initially and at least annually thereafter:

(1) Medical and interim history including smoking history

(2) Physical examination including funduscopic

(3) Blood pressure

(4) Chemical screen profile -- SMAC-24 or comparable blood chemistry tests including total and high-density lipoprotein cholesterol and triglycerides

(5) Urinalysis

(6) Chest X-ray

(7) Resting electrocardiogram -- standard 12-lead

(8) Exercise Tolerance Test (ETT) including thallium perfusion study

The present qualifying criteria would apply for those test components already included in pilot examinations. The examining physician and the reviewing physician of the FAA should exercise judgment with regard to the additional risk factors included above, i.e., smoking history, and blood lipids.

The Exercise Tolerance Test should be performed on a motor driven bicycle ergometer, or treadmill with little and preferably no use of handrails, both accurately calibrated, with accompanying thallium perfusion scans. X-ray type reproductions of the thallium scans should be submitted to the FAA which in turn would have them reviewed by a recognized expert in their interpretation. The examinee would be considered to have obtained "clearance" on this medical evaluation if he/she can demonstrate an uncompromised capability to complete a progressive exercise protocol achieving at least a total body metabolic intensity of ten (10) multiples of resting rate (METs) over a period of no less than ten (10) minutes with at least three minutes above seven (7) METs. This can be achieved by completing nine minutes of a Standard Bruce Protocol. An eight (8) MET criterion appears appropriate for women. In addition the thallium scan interpretation should be clear of defects, except that a defect seen on the immediate post-exercise film which persists unchanged in a post-three-hour film may, based on the physician's judgment, not be considered disqualifying.

Compromising responses on the ETT would be the occurrence of any of the following:

1. More than -0.10 millivolts horizontal or downsloping ST segment depression (or equivalent elevation) in any precordial lead or Leads I or aVL during or after exercise or more than -0.15 mV in lead aVF. Some correction for R wave amplitude may be appropriate where R waves exceed 2.0 mV in height.

2. Occurrence of three or more sequential premature atrial or ventricular complexes during exercise.

3. Decline of more than 20 mm Hg of systolic pressure with continued exercise beyond the initial adjustment to the test protocol.

4. Less than coherent verbal responses, staggering, ataxia or other evidence of intolerance to the exertional demands.

5. Chest discomfort or any form of "anginal equivalent."

The comprehensive flight proficiency protocol, should consist of the following components:

1. Written test of knowledge.

   The pilots should be given an annual written test on their knowledge of their aircraft's systems, the procedures specific to the aircraft itself, and the applicable information from the Federal Aviation Regulations and the Airman's Information Manual. This will serve as a check on the retention of the cognitive and procedural information which tends to deteriorate over time, especially if the pilot reviews and/or uses this information infrequently. The test materials relating to the Federal Aviation Regulations and the Airman's Information Manual should be written by the FAA and focus on the areas specified in FAR 121.419(a). The FAA already has a significant battery of test items on subject matter in these domains and would be best suited to develop tests measuring the extent to which pilots have a satisfactory knowledge of the regulations and procedures related to aircraft operations in the airspace system. Tests on the pilots' knowledge of their aircraft's systems and procedures would best be developed by the manufacturers of the aircraft across all airlines who use that equipment. But since this is highly unlikely, the individual airlines should develop such tests, and those tests should be approved by the Administrator.

2. Perceptual-motor skills of piloting.

   The perceptual-motor skills of piloting the aircraft should be checked twice each year (at least once every six months) to ensure the ability of the pilots to perform the tasks required of their flightcrew positions. One should utilize the computer-based flight simulator systems, presently used by the industry for initial checkout and upgrade training and line oriented flight training (LOFT), to measure the proficiency or skill of the pilots. The FAA specifies the maneuvers and procedures that should be performed in a proficiency check ride (Appendix F or Part 121) and has set tolerances for performance on flight parameters in the Advisory Circular AC61-77, Airline Transport Pilot Airplane Practical Test Guide. The flight simulators can be rather easily programmed to monitor the pilot's ability to maintain the flight parameters of the aircraft within the tolerances set forth by the FAA. The current modern simulators in use are controlled by computers, and specific parameters, such as airspeed, altitude, course deviation, deviation from flight paths, rates of ascent or descent, and other information regarding flight controls and parameters, can be monitored by the computer and information produced indicating the frequency and magnitude of any deviations from the desired parameters. This would provide for the determination of skill level (proficiency) in the most objective manner possible at the time.

3. Application of rules and procedures.

   Procedural items are to be evaluated in terms of the satisfactory completion of the appropriate sequence of steps (as per the approved airplane operating manual) in a timely manner. This should also be done at least once every six months. The specific steps of the procedures are set forth in the manuals and could be programmed into the computer that would check for the appropriateness of responses. The timeliness of the pilot's behaviors should be determined by the recommendations of the manufacturer of the equipment based upon the maximum reasonable time that would prevent further aggravation of the abnormal situation. For flight skills and procedures which must be performed in the actual aircraft, relatively objective manually scored checklists can be developed which will reflect the magnitude of deviations from physical parameters, correctness of procedures, and the extent of proper management of cockpit resources on hand.

It is recommended that a flight simulator as per Appendix H of Part 121 of the FAR be utilized for the measurement of performance to the greatest extent possible. The actual maneuvers and procedures included in the proficiency flight checks should include, but not be limited to, those set forth in Appendix F of Title 14 CFR, Chapter 1, Part 121.

The criteria for judging performances should be based upon the effects of the pilot's behaviors upon safety of flight and the flight test standards published by the FAA.

References for the flight proficiency protocol:

FAR Part 121.415	Crewmember and dispatcher training requirements.
121.417	Crewmember emergency training.
121.419	Pilots and flight engineers: Initial, transition, and upgrade ground training.
121.424	Pilots: Initial, transition, and upgrade flight training.
121.427	Recurrent training.
121.433	Training Required.
121.434	Operating experience.
121.437	Pilot qualification: Certificates required.
121.439	Pilot qualification: Recent experience.
121.440	Line checks.
121.441	Proficiency checks.
121.443	Pilot in command qualifications: Route and airports.

Appendix E of Title 14 CFR Part 121, Subpart W - Flight Training Requirements. Maneuvers and procedures required by Section 121.424 to be performed in flight except to the extent that certain maneuvers and procedures may be performed in an airplane simulator with a visual system (visual simulator), an airplane simulator without a visual system (nonvisual simulator), a training device, or a static airplane as permitted by Appendix E.

Appendix F of Title 14 CFR Ch. 1 Pt. 121, Subpart W - Proficiency Check Requirements. Specifies the maneuvers and procedures required by Section 121.441 of 14 CFR Ch. 1, Subchapter G, Part 121, Subpart N.

AC61-77 Airline Transport Pilot Airplane Practical Test Guide.
Designed to assist the applicant and his instructor in preparation for the Airline Transport Pilot Certificate with an Airplane Rating under FAR Part 61 (revised).

AC120-36A Line-Oriented Flight Training Programs.
Sets forth one means, not the only means, acceptable to the Administrator for approval of a line-oriented training program under FAR 121.409.

AC120-40 Airplane Simulator and Visual System Evaluation.
Sets forth one means that would be acceptable to the Administrator for the evaluation of airplane simulators to be used in training programs or for airmen checking under Title 14 Code of Federal Regulations (CFR). See FAR Part 121 Appendix H - Advanced Simulation Plan.

Evaluation methodologies relevant to pilots' health and proficiency are continuing to be developed. For example, the Single Photon Emission Computer Tomographic (SPECT) approach, now becoming more widely available, may enhance the capabilities of thallium imaging; radionuclide angiography may also provide useful information, but performance standards for persons aged 60 and over need further definition. More quantitative predictive values for risk factors such as those referred to above should also become available. The FAA should assure that it is kept adequately informed of progress in such development and, together with ongoing analysis of the results and outcomes of the above tests, should modify its requirements from time to time.

In addition, a program should be developed to collect data on a random selection of pilots between the ages of 40 through 55 for normative purposes. These data could also be utilized for longitudinal documentation of the individual changes in piloting abilities over time.

US Department of Transportation
Federal Aviation Administration

Office of the Administrator

800 Independence Ave., S.W.
Washington, D.C. 20591

APR 26 1985

The Honorable Edward R. Roybal
Chairman, Select Committee on Aging
House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

This is in reply to your letter of March 20 which seeks further information from the FAA concerning the age 60 rule. I am pleased to respond to the issues you have raised in your letter.

Among other things, you have asked the FAA to specify those conditions that the FAA has identified "which cannot be predicted or diagnosed and which would jeopardize flight safety if not discovered. . . ." Actually, my original response to you indicated that there are many "medical conditions, the onset of which we cannot predict to a sufficient degree to provide an appropriate assurance of safety." (Emphasis added.) Therefore, what is significant is not that there may be some means of predicting or diagnosing some of these conditions, but that for many of these potentially threatening conditions there are substantial limitations associated with the accuracy or practicability of the methods available to make such predictions or diagnoses. You have asked me to specify conditions for which we believe the ability to predict or detect their occurrence is limited by the current state of medical science. Some examples of such conditions are: neoplastic diseases of various body organs; ischemic cerebrovascular disease; cerebrovascular conditions that lead to cerebral hemorrhage and subarachnoid hemorrhage; Parkinson's disease; dementia; endocrine disorders, including disorders of the thyroid and pancreas; and cardiovascular disease, including disease of the coronary arteries and peripheral vascular system. The frequency of these disorders increases with age.

There are a variety of other conditions which typically increase in severity or are aggravated by age, and which, because of their often subtle nature, do not necessarily lend themselves to detection. Even if such subtle changes were detected, there is no validated way to relate such information to the specific level of capabilities needed to safely pilot a commercial aircraft. Examples of these conditions are: decreased dynamic visual acuity and acuity under low illumination; diminished visual accommodation and field; a slowing in the ability to process and respond to information;

and altered speed, capacity or accuracy associated with various aspects of attention, psychomotor performance, memory, and problem-solving ability.

There are varying degrees to which we can predict or diagnose the existence of the kinds of conditions and disorders I have enumerated above. Some of these conditions, of course, are more serious than others from a safety perspective. Moreover, there are different degrees to which different individuals may be afflicted by such disorders. Although conditions such as I have mentioned may be found at any age, the frequency of such disorders does increase with age.

We continually seek to remain abreast of advances in medical science and to be generally familiar with the accuracy and availability of various testing methods to identify underlying disease processes and functional deficiencies. As I have indicated, there exists no practical testing methodology for a variety of conditions which may affect aging pilots. This view was confirmed by the National Institute on Aging (NIA) Panel on the Experienced Pilots Study. This Panel concluded that age-related changes in health and performance influence adversely the ability of an increasing number of individuals to perform as pilots with the highest degree of safety and, consequently, could endanger the safety of the aviation system as a whole. Moreover, the Panel could not identify the existence of a medical or performance appraisal system that can single out those pilots who would pose the greatest hazard because of early or impending deterioration in health or performance. This is a very significant conclusion which, in our view, cannot easily be dismissed nor should it be.

After the NIA report was issued, in keeping with the report's recommendations, the FAA issued an Advance Notice of Proposed Rulemaking (ANPRM) on June 23, 1982, which sought comments on a plan that would allow air carrier pilots to voluntarily enter a program for collection of medical and performance data that might form a basis for relaxation of the age 60 rule. After the review of public comments on this proposal, the FAA withdrew the ANPRM on March 20, 1984, because, it was determined that, in the absence of validly selective tests, there are not sufficient means of collecting quantitative medical and performance data on airline pilots under conditions of actual operational stress and fatigue that do not introduce an unacceptable safety risk.

The Panel's findings, together with our assessment of the comments received in response to the ANPRM and our continued review of the scientific literature, persuade us that the age 60 rule should not be changed at this time. Since the purpose of this rule is to assure that air carriers are providing their services consistent with the highest degree of safety, we intend to make no changes to the rule until we are confident that the safety of the American traveling public would not be jeopardized. We simply have no basis for such confidence at this time, but we will continue to monitor advancements in science in order to initiate appropriate changes to the rule when they are warranted.

I am enclosing a copy of the original NPRM that proposed the establishment of the age 60 rule, the issuance incorporating the final rule, and the withdrawal of the recent ANPRM I have mentioned. I trust this is responsive to your inquiry.

Sincerely,

Don Engen

Donald D. Engen
Administrator

Enclosures

Representative Retirement Ages for Pilots of Major Flag Airlines

British Caledonian	Retirement from the left-hand seat at age 57 but permitted to fly in the right-hand seat until age 60.
British Airways	Age 55.
KLM	Age 56 with provision to carry on until age 60 but this opposed by younger pilot group.
Lufthansa	Age 55.
American	Age 60.
Qantas	Age 55 but selective to age 57.
Iberia	Age 60.
Middle East	Age 60.
Air France	Age 60 but possibility to retire at 50 with full pension.
SAS	Age 60 but selective at 55.
Pakistan	Age 60.
Air Canada	Age 60 but 50% of the pilot group took retirement at 55.
Finn Air	Ability to retire at 52 with full pension - mandatory retirement at 55.
Pan American	Age 60.
TWA	Age 60.

Source: Air Transport Association (November, 1983)

Air Transport Association OF AMERICA

1709 New York Avenue, NW
Washington, DC 20006
Phone (202) 626-4000

October 16, 1985

Honorable Edward Roybal
Chairman
Select Committee on Aging
U.S. House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

The Air Transport Association of America (ATA) which represents the scheduled airlines of the United States* appreciates this opportunity to comment once again on the mandatory retirement age for pilots, the Age 60 Rule. For your record, I would like to reiterate the comments which we made on the National Institute of Aging's Report titled "Airline Pilot Age, Health and Performance: Scientific and Medical Considerations" in May 1981.

The basic issue raised by any consideration of a mandatory retirement age for airline pilots is safety; it is not an issue of discrimination, economics, or pension plans, but safety. The Report confirmed that:

1. Pilot performance can be adversely affected both by decrements accompanying the aging process and by a broad variety of medical conditions, the incidence of which increases with age.

2. Despite the various advances which the Report advocates be considered with a view towards improving the medical certification process, validated medical and pilot performance tests to measure certain age-related performance decrements and the effects of such decrements on pilot proficiency are lacking.

---

* Of the 32 ATA member airlines, Frontier Airlines and Republic Airlines have differing views on the mandatory retirement of pilots at age 60.

ATA thus views the Report as providing solid additional support for its position that safety should in no way be compromised by a change in the mandatory retirement of pilots at age 60.

Sincerely,

J. Roger Fleming

J. Roger Fleming
Senior Vice President
Technical Services

EDWARD R. ROYBAL, CALIFORNIA
CHAIRMAN

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RICHARD H. STALLINGS, IDAHO

FERNANDO TORRES-GIL
STAFF DIRECTOR

U.S. House of Representatives
Select Committee on Aging
Washington, DC 20515
Telephone: (202) 226-3375

MATTHEW J. RINALDO, NEW JERSEY
RANKING MINORITY MEMBER

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PAUL SCHLEGEL
MINORITY STAFF DIRECTOR

October 29, 1985

Don E. Flinn, M.D.
Professor and Chairman
Department of Psychiatry
School of Medicine
Texas Tech University Health Sciences Center
Lubbock, Texas 79430

Dear Dr. Flinn:

The Select Committee on Aging held a hearing to examine the continued need for the Federal Aviation Administration's Age 60 Rule for commercial airline pilots on October 17, 1985. Because you submitted written testimony for the Committee's November, 1983 hearing on the same subject, I would appreciate your sharing your views with the Committee again. A copy of your 1983 submission and testimony from the recent hearing are enclosed.

You may use your 1983 testimony as a basis for discussing the following:

1. What are your academic and professional qualifications to render an opinion on this issue?
2. Is a mandatory retirement age for commercial airline pilots medically and scientifically justified at the present time? Why or why not?
3. The National Institute on Aging's Experienced Pilots study in 1981 endorsed continuation of the Age 60 Rule. Are you aware of any research findings or testing developments since that time which lead you to believe that the Age 60 Rule may now be safely eliminated?

Please feel free to refer to the enclosed statements and incorporate any evidentiary material in your response. Your reply should be directed to me at the address on this letterhead by November 14, 1985. Please call John Vihstadt (202-226-3394) if you have any questions.

The Committee looks forward to your contribution on this issue.

Sincerely yours,

MATTHEW J. RINALDO
Ranking Minority Member

MJR:jv
Enclosures

Texas Tech University Health Sciences Center
SCHOOL OF MEDICINE / Department of Psychiatry
Lubbock, Texas 79430-0001 / (806) 743-2800

November 12, 1985

Mr. John Vihstadt
U. S. House of Representatives
Select Committee on Aging
Washington, D.C. 20515

Dear Mr. Vihstadt:

Enclosed please find my comments on the Age 60 Rule. I hope that they will be helpful.

If you have any questions, please let me know.

Sincerely yours,

Don E. Flinn, M.D.
Professor and Chairman
Department of Psychiatry

DEF/da

Enclosure

Texas Tech University Health Sciences Center
SCHOOL OF MEDICINE / Department of Psychiatry
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November 12, 1985

WRITTEN COMMENTS OF DON E. FLINN, M.D.

FOR THE

SELECT COMMITTEE ON AGING

U.S. HOUSE OF REPRESENTATIVES

My name is Don E. Flinn, M.D. I am Professor and Chairman in the Department of Psychiatry at Texas Tech University School of Medicine. I am certified by the American Board of Psychiatry and Neurology. I retired from the Air Force after 22 years of duty as a Flight Surgeon. During that time, my duties also included assignments as Chief of Psychiatry at the School of Aerospace Medicine in San Antonio and as Consultant in Psychiatry to the Surgeon General of the Air Force in Washington, D.C. In the 18 years since I retired from the Air Force, I have held faculty positions at the U.C.L.A. School of Medicine and the University of Texas School of Medicine in San Antonio in addition to my present position. During this time I have served as a Consultant to the Federal Air Surgeon and to the Medical Director of the Air Line Pilots Association, as well as to airline medical directors. I would like to submit comments on whether the FAA rule requiring airline pilots to retire at age 60 is justified by current knowledge about intellectual functioning and psychomotor performance.

It has been stated by others that all airline pilots need not be forced to retire at the same age, since there is considerable variation in the health and in the functional ability of individuals as they age. It has been further suggested that it would be more appropriate to individualize the age at which airline pilots must retire through using a "physiological index". In my opinion, no such index of psychomotor functioning exists at this time. It is possible to measure a wide variety of individual perceptual, intellectual, psychomotor and psychophysiological functions. However, the relationship of these discrete functions to complex tasks such as decision making and performance in piloting a commercial aircraft has not been validated. Complex performance depends upon the interrelationship of all of these functions. No formula presently exists for combining these individual functions into a "physiological index" of aging. In this respect I agree with the findings of the Institute of Medicine Report on Air Line Pilot Age, Health and Performance which concludes that the point at which measurable change in pilot performance becomes operationally significant is yet to be determined.

It has been proposed that age related decrements in pilot performance can be detected through the use of flight simulators. However, it is my experience that pilots seen for psychiatric and psychological evaluation may have clinically significant decrements in intellectual function and pscyhomotor performance which have not been detected by routine flight simulator checks conducted by the airlines. This experience is also compatible with that of the FAA-Airline-ALPA program for dealing with impaired pilots, referred to in the Institute of Medicine Report, which states that detailed histories of such pilots resulted in the retrospective identification of proficiency problems in about 30% of the total number of cases, although proficiency may not have deteriorated to the point of being identified by flight training personnel.

In summary, I believe that a uniform age at which all air line pilots should retire is necessary, since no age related "psychophysiological index" of intellectual and psychomotor functions exists at present. In view of the steadily increasing morbidity and impairment of function occurring at about that age, I believe the decision to choose age 60 for retirement was justifiable, and I know of no existing research which would demonstrate that another age is more appropriate.

NASA - Ames Research Center
Moffett Field, California 94035
November 12, 1985

Hon. Matthew J. Rinaldo
U. S. House of Representatives
Select Committee on Aging
Washington, D. C. 20515

Dear Mr. Rinaldo:

I am enclosing the original and one copy of answers I have prepared in response to your request of October 29th, concerning mandatory retirement of airline pilots at the age of 60.

I am pleased to be able to assist the Committee in its studies of this important matter. If you have questions about this material, please feel free to contact me at the above address or by telephone at 415-694-5718.

Respectfully yours,

Charles E. Billings

Charles E. Billings, M. D.

ANSWERS TO QUERIES FROM MATTHEW J. RINALDO, November 10, 1985

The following answers are submitted pursuant to a request by Matthew J. Rinaldo, Member of Congress, dated October 29, 1985 and received November 1, 1985. The answers are based on the author's personal experience and expertise. They are offered as the opinions of a private citizen.

1. What are your academic and professional qualifications to render an opinion on this issue?

I am Senior Scientist of the Aerospace Human Factors Research Division, NASA-Ames Research Center. I am a physician, certified by the American Board of Preventive Medicine in Aerospace Medicine and Occupational Medicine. From 1960 to 1973 I was Professor of Aerospace Medicine at The Ohio State University, where I was also Director of the Aviation Medicine Research Laboratory from 1960 to 1970 and Director of the Division of Environmental Health from 1970 to 1973. From 1973 until my retirement in 1983 I was a Clinical Professor of Preventive Medicine at Ohio State University; from 1979 to 1982 I was a Clinical Professor of Aerospace Medicine at Wright State University. I have been employed by NASA as a Medical Research Officer since 1973. From 1976 to 1980 I headed the Aviation Safety Research Office at Ames; I was Assistant Chief for Research of the Man-Vehicle Systems Research Division from 1980 to 1983, before being appointed Senior Scientist.

I am a Fellow and Past President of the Aerospace Medical Association and a Fellow of the American College of Preventive Medicine and the American Academy of Occupational Medicine. I am also a Member of the International Academy of Aviation and Space Medicine. I have been a pilot since 1953; I hold a commercial pilot license endorsed for airplane single and multi engine land, helicopters and an instrument rating. I have received numerous national government and industry awards for my aviation safety research; I was a member of the Panel on the Experienced Pilots Study of the National Institute of Aging.

2. Is a mandatory retirement age for commercial airline pilots medically and scientifically justified at the present time? Why or why not?

In spite of the impressive advances that have been made in medical treatment and in our understanding of primary prevention techniques, it is still true that death and disability from degenerative disease processes increase with increasing chronological age. This is true of airline flight crew members, as it is for all other population groups. Though the incidence of coronary artery disease may be decreasing, it is still very substantial, as evidenced by the large numbers of by-pass operations being performed and by the large number of applications for medical certificates from persons with these disorders.

It is also known that at least some of the skills necessary for flight crew performance deteriorate with advancing age. Such deterioration is often subtle rather than grossly evident, and affects the highest intellectual skills. Regardless of individual exceptions that may be cited, all available data indicate that the population as a whole is subject to both phenomena: an increasing rate of disability or death due to physical disorders, and deterioration in skilled performance, with increasing age.

A third factor of importance is that population variability with respect to these factors increases with increasing age. This means that predictive indices suffer from a progressive decrease in discriminatory power with advancing age. While our medical diagnostic and performance assessment skills have improved in the past 25 years, feasible diagnostic tests for screening of airline flight crew members have not, in my view, improved to the point where they can be depended upon to detect reliably either the person who will manifest such a disease during the several months following examination, nor the person who may be unable to perform his crew duties safely in a novel or critical situation.

I agree with the NIA Panel's finding that "...there is no convincing medical evidence to support the age of 60, or any other specific age, as a cutoff point...". I also agree with the Panel's finding that "...air carriers, operating under the limiting conditions of the age 60 rule, have achieved a very high level of safety..." (NIA Panel Report, p. 2). Though age-related death and disability rise prior to that age, it would appear that the original, admittedly arbitrary choice of mandatory retirement age has been sufficienctly conservative to insure the highest level of safety. Whether an older age limit would have been as effective is not known, but the data indicate that risk increases, at an accelerating rate, with each additional year of chronological age. I must therefore continue to support a mandatory retirement age for air carrier pilots until such time as I see persuasive evidence that validated predictive tests feasible for application to this population are available.

Because the likelihood of sudden death, disability and incapacitation due to previously undetected disease increases at an accelerating rate with increasing age, it is my opinion that to increase the current mandatory retirement age will compromise, by some amount, that level of safety, and that the magnitude of the risk will increase with each additional year flight crew members are allowed to remain in the cockpit.

3. The National Institute on Aging's Experienced Pilots Study in 1981 endorsed continuation of the Age 60 Rule. Are you aware of any research findings or testing developments since that time which lead you to believe that the Age 60 Rule may now be safely eliminated?

I believe that the widespread use of Thallium-Technitium scanning during exercise provides improved diagnostic accuracy with respect to compromise of the myocardium and thus that those persons who are evaluated with this relatively non-intrusive technique can be diagnosed with greater accuracy than previously. Whether these quite expensive and time-consuming techniques are feasible as screening tests for several thousand pilots is quite another matter.

I remain most concerned about the effectiveness of current screening techniques for subtle intellectual deficits, notwithstanding the optimistic views that have been submitted to the Committee by others. I have seen no evidence that objective, reliable tests of cognitive function in a rich and rapidly-changing environment exist, let alone that they have been applied to or validated in a pilot population of any age. In view of the fact that the vast majority of our air transport accidents are caused by failures of judgement and decision-making, I believe that the Age 60 rule cannot be safely eliminated until such tests have been developed, the results published in the open literature, and used in the field for long enough to demonstrate their effectiveness as predictive indices of pilot cognitive and decision-making performance.

Charles E Billings

Charles E. Billings, M. D., M. Sc.

APPENDIX 3

U.S. DEPARTMENT OF TRANSPORTATION,
FEDERAL AVIATION ADMINISTRATION,
Washington, DC, October 22, 1981.

DEAR DOCTOR: Enclosed for your use in performing medical examinations on applicants for airman medical certificates is a copy of the 1981 revision of the Guide for Aviation Medical Examiners. This revision supersedes previous editions of the Guide. Those previous editions should now be destroyed.

Since a significant amount of new guidance material is contained in the revised Guide, I request that you carefully review the document as soon as possible. If you have questions regarding information contained in the Guide, please contact your Regional Flight Surgeon. In addition, if you have comments on the Guide itself, please share them with your Regional Flight Surgeon.

You will note that Chapter 1 of the Guide contains miscellaneous administrative information. Chapters 2, 3, and 4 deal with the completion of the application form (FAA Form 8500-8), your conduct of the examination, and decision making in respect to certification. The Item Numbers in the Guide correspond to the Item Numbers on the application form. In general, under each Item Number you will find reference to the applicable regulations, examination procedures that should be followed, and pertinent decision-making information.

Unfortunately, not all medical conditions that may be encountered in the conduct of a medical certification examination could be mentioned in the Guide. Furthermore, while the Guide contains general statements of Federal Aviation Administration certification policy regarding certain medical conditions, it must be recognized that final certification decisions are highly individualized.

As you will note, the enclosed document requires assembly by your staff. We hope you will find that it is a significant improvement over previous editions.

Sincerely,

H.L. REIGHARD, M.D.,
Federal Air Surgeon.

Enclosure.

GUIDE FOR AVIATION MEDICAL EXAMINERS

October 1981

INTRODUCTION

The Guide for Aviation Medical Examiners has been prepared to assist designated Aviation Medical Examiners in the efficient and effective performance of their duties and responsibilities as representatives of the Federal Aviation Administration (FAA). Upon receipt of this publication, all previous editions of the Guide should be destroyed. The format of the Guide has been changed significantly. All material contained in the Guide is keyed to the corresponding item number contained on FAA Form 8500-8, Application for Airman Medical Certificate or Airman Medical and Student Pilot Certificate.

Medical standards established by law are those contained in the Federal Aviation Regulations (FAR), Part 67 (14 CFR 67), a copy of which is included in the Guide for convenience and easy reference.

The Guide includes the Federal Air Surgeon's interpretation of the Federal Aviation Regulations, Part 67, Medical Standards and Certification.

This revision provides all pertinent information and guidance needed to perform the duties and responsibilities delegated to each Examiner by the FAA.

SUMMARY FOR AME GUIDE

Class of Medical Certificate and Type of Pilot	First-Class Airline Transport	Second-Class Commercial	Third-Class Private
DISTANT VISION	20/20 in each eye separately without correction or at least 20/100 in each eye separately corrected to 20/20 or better with corrective lenses (glasses or contact lenses). (See page 56)		At least 20/50, without correction; or if vision is poorer than 20/50, must correct to 20/30 or better with corrective lenses (glasses or contact lenses). (See page 56)
NEAR VISION	At least 20/40 with each eye separately, with or without correcting glasses. (See page 61)		At least 20/60 with each eye separately with or without correcting glasses. (See page 61)
HYPERPHORIA	Maximum of 1 diopter. (See page 66)		No standard.
ESOPHORIA & EXOPHORIA	Maximum of 6 diopters of esophoria or exophoria. (See page 66)		No standard.
COLOR VISION	Normal color vision. (See page 63)	Ability to distinguish aviation signal red, aviation signal green and white. (See page 63)	
AUDIOMETRY	Maximum of 40 dB at 500 Hz; 35 dB in frequencies of 1,000 and 2,000 Hz, ISO. (See page 54)	No requirement. Audiometry may be performed as a service to the applicant with his/her permission.	
HEARING	Able to hear whispered voice at 20 feet. (See page 53)	Able to hear whispered voice at 8 feet. (See page 53)	Able to hear whispered voice at 3 feet. (See page 53)
ENT	No acute or chronic disease of ear, mastoid, or problem with equilibrium; no unhealed perforation of eardrum. (See page 21)		No acute or chronic disease of ear, no acute or chronic ENT problems, including no problem with equilibrium. (See page 21)
PULSE	At rest, maximum of 100; maximum of 120 after exercise returning to within 10 beats of resting pulse after 2 minutes. (See page 69)		
BLOOD PRESSURE	Maximum of 160/98 at age 50 and over. (See page 68 for BP for younger pilots)	Maximum of 170/100. (See page 68)	
EKG	Required at age 35, and annually after age 40. (See page 71)	Not required if cardiovascular examination is normal. (See page 71)	
OTHER CONDITIONS	Examiner must disqualify if the applicant has: Diabetes Mellitus requiring hypoglycemic medication; angina pectoris or other evidence of coronary heart disease that may lead to an infarction; myocardial infarction; epilepsy; alcoholism; drug dependence; disturbance of consciousness without satisfactory medical explanation; personality disorder manifested by repeated overt acts.		

Note: For further information, contact your Regional Flight Surgeon. (See Appendix 3 for phone numbers)

CHAPTER 1
GENERAL INFORMATION

This chapter provides general information important to the Aviation Medical Examiner (hereinafter referred to as Examiner) for the efficient and effective performance of his or her duties. It also describes attendant responsibilities as the Federal Aviation Administration's (FAA) representative in medical certification matters and the link between the airman and the FAA.

1. LEGAL RESPONSIBILITIES OF DESIGNATED AVIATION MEDICAL EXAMINERS

The Federal Aviation Act of 1958 authorizes the FAA Administrator to delegate to qualified private persons certain statutory powers and duties, including the conduct of examinations and issuance of certificates. Designated Aviation Medical Examiners have been delegated the Administrator's authority to examine applicants for airman medical certificates and to issue or deny issuance of certificates. Approximately 575,000 applications for airman medical certification are filed and processed each year. The vast majority of medical examinations conducted in connection with these examinations are performed by physicians in private practice who have been designated to represent the FAA for this purpose. The Examiner is a designated representative of the FAA Administrator, with important duties and responsibilities. It is essential that the Examiner recognize the responsibility associated with the appointment.

The consequences of a negligent or wrongful certification, which would permit an unqualified person to take the controls of an aircraft, can be serious for the public, the Government, and for the Examiner. If the examination is cursory and the Examiner fails to find a disqualifying defect that should have been discovered in the course of a thorough and careful examination, a safety hazard may be created and the Examiner may bear the responsibility for the results of such action.

Of equal concern is the situation in which an examining physician deliberately fails to report a disqualifying condition either observed in the course of the examination, or otherwise known to exist. In this situation, both the applicant and the Examiner, in completing the application and medical report form, may be found to have committed a violation of Federal criminal law, Title 18 U.S.C. 1001, which provides that--

> Whoever in any matter within the jurisdiction of any department or agency of the United States knowingly and willfully, falsifies, conceals, or covers up by any trick, scheme, or device a material fact, or who makes any false, fictitious or fraudulent statements or representations, or makes or uses any false writing or document knowing the same to contain any false, fictitious or fraudulent statement or entry, shall be fined not more than $10,000 or imprisoned not more than 5 years, or both."

It is the FAA policy to forward falsification cases to the Department of Justice for criminal prosecution. This policy is adhered to, whether the false statement is by the applicant, the Examiner, or both. In view of the pressures sometimes placed on Examiners by their regular patients to ignore a disqualifying physical defect which the physician knows to exist, it is important that all Examiners be aware of the FAA's firm policy in this respect.

In addition, when an airman has been issued a medical certificate which should not have been issued, it is frequently necessary for the FAA to commence a legal revocation or suspension action to regain the certificate. This procedure is time consuming and costly. Also, while the proceeding is pending, the airman may continue to exercise the privileges of the certificate, thereby compromising aviation safety.

2. AUTHORITY OF AVIATION MEDICAL EXAMINERS

The Examiner is delegated authority to (a) examine applicants for, and holders of, airman medical certificates to determine whether they meet the medical standards applicable for the issuance of an airman medical certificate; and (b) issue or deny airman medical certificates to applicants or holders of such certificates based upon whether they meet the applicable medical standards. The medical standards are in Part 67 of the Federal Aviation Regulations (FAR). The FAR are contained in Chapter 14 of the Code of Federal Regulations (14 CFR 67).

A medical certificate issued by an Examiner is considered to be affirmed as issued unless, within 60 days after date of issuance, it is reversed by the Federal Air Surgeon or Regional Flight Surgeon or the Chief, Aeromedical Certification Branch, Civil Aeromedical Institute. However, if the FAA requests additional information from the applicant within 60 days after the issuance, the above-named officials may reverse the issuance within 60 days of receipt of the information.

3. NO "ALTERNATE" EXAMINERS DESIGNATED

The Examiner is to conduct all medical examinations in his/her regular office. Exceptions to this are military reserve medical officers who perform examinations while on duty on a military base under the direction of the Senior Flight Surgeon (facility designation number to be used) and in clinic operations where performance of certain portions of the examination may be delegated to another physician. In the latter case, the Examiner must assume responsibility for the accuracy and completeness of the total report of examination. In these cases, the amount charged for an examination may not exceed the amount normally charged for an examination conducted by one physician.

The Examiner who plans to be absent from the office for any length of time is not permitted to conduct examinations at a temporary address and is not permitted to name an alternate Examiner. During the absence of the Examiner, applicants for airman medical certification shall be referred to another Examiner in the area.

4. WHO MAY BE CERTIFIED

a. Age Requirements

There is no age restriction for medical certification. Examiners have, however, been delegated authority to issue the combined Airman Medical and Student Pilot Certificate (yellow form) For issuance of the combined certificate, the applicant must have reached his/her 16th birthday.

Minimum age requirements for the various airman certificates are defined in the Federal Aviation Regulations Part 61, as follows:

(1) Student pilot certificate: powered aircraft - 16 years; gliders - 14 years.

(2) Private pilot rating: powered aircraft - 17 years; gliders - 16 years.

(3) Commercial pilot rating - 18 years.

(4) Airline transport pilot rating - 23 years.

b. Nationality requirements. There is no restriction regarding the issuance of an FAA medical certificate to a person who is not a citizen of the United States. If the applicant meets the medical standards of the class certificate applied for, the Examiner may issue the certificate regardless of the applicant's citizenship. However, applicants for an Airman Medical and Student Pilot Certificate must be able to read, speak, and understand the English language.

If the examiner believes the applicant for a Medical/Student Pilot Certificate cannot read, speak, and understand the English language, the applicant shall be referred to the nearest General Aviation District Office (GADO) for a determination of eligibility for the Student Pilot Certificate. Under these circumstances, the Examiner may issue only a medical certificate (white form).

5. CLASSES OF MEDICAL CERTIFICATES

The class of medical certificate for which an individual applies will be issued if the applicant possesses the required medical qualifications.

Regardless of whether an applicant holds an airman certificate of a higher class, it is only necessary to have a medical certificate of a class appropriate to the airman privileges exercised. For example, an airman who holds an Airline Transport Pilot (ATR) rating may pilot aircraft while holding only a third-class medical certificate as long as flying activities are limited to those authorized for private pilots. Also, an applicant need not hold an Airline Transport Pilot Certificate to be eligible for a first-class medical certificate.

Listed below are the three classes of airman medical certificates and with each, the categories of airmen requiring such a medical certificate in order to exercise their privileges.

First-Class - Airline Transport Pilot

Second-Class - Commercial Pilot; Flight Engineer; Flight Navigator; Air Traffic Control Tower Operator (does not include FAA Air Traffic Control Specialists. These employees are required to meet Office of Personnel Management (OPM) medical standards)

Third-Class - Private Pilot

Glider and Free Balloon Pilots are not required to hold a medical certificate of any class. To be issued Glider and Free Balloon Airman Certificates, the applicant need only certify that he/she has no known medical defect that makes him/her unable to pilot a glider or free balloon.

6. VALIDITY OF MEDICAL CERTIFICATES

A First-class medical certificate is valid for the remainder of the month of issue plus 6 calendar months, or plus 12 calendar months for activities requiring a second-class medical certificate; or plus 24 calendar months for activities requiring a third-class medical certificate.

A Second-class medical certificate is valid for the remainder of the month of issue plus 12 calendar months; or plus 24 calendar months for activities requiring a third-class medical certificate.

A Third-class medical certificate is valid for the remainder of the month of issue plus 24 calendar months.

Each medical certificate must bear the same date as the date of medical examination regardless of the date the certificate is actually issued.

7. FAR 61.53 "OPERATIONS DURING MEDICAL DEFICIENCY"

No person may act as a pilot in command, or in any other capacity as a required pilot flight crewmember while he/she has a known medical deficiency, or increase of a known medical deficiency, that would make him/her unable to meet the requirements for his/her current medical certificate.

8. RE-EXAMINATION OF AN AIRMAN

A holder of a medical certificate may be required to undergo a reexamination at any time if, in the opinion of the Federal Air Surgeon or his/her authorized representative within the FAA, there is a reasonable basis to question the airman's ability to meet the medical standards. An Examiner may not order such re-examination.

9. EXAMINATION FEES

The FAA does not establish fees to be charged by Examiners for the medical examination of airman applicants. It is recommended that the fee be equivalent to that established for similar services in the Examiner's local area.

10. RELEASE OF INFORMATION

Except in compliance with an order of a court of competent jurisdication, or upon request by the applicant, Examiners will not divulge or release copies of any reports prepared in connection with the examination to anyone other than the applicant or the FAA. Upon receipt of a court subpoena or order, the Examiner shall notify the appropriate Regional Flight Surgeon. Other requests for information will be referred to:

Chief, Aeromedical Certification
Branch, AAC-130
Federal Aviation Administration
Post Office Box 26080
Oklahoma City, Oklahoma 73125

11. DUPLICATE COPIES OF MEDICAL CERTIFICATES

Medical certificates which are lost or accidentally destroyed may be replaced upon proper application to the Aeromedical Certification Branch, Oklahoma City, provided such certificates have not expired. The airman's request for replacement must be accompanied by a remittance of 2 dollars ($2.00) made payable to the FAA. This request must include:

a. The airman's full name and date of birth.

b. The class of certificate.

c. The place and date of examination.

d. The name of the Examiner.

e. The circumstances of the loss or destruction of the original certificate.

The duplicate certificate will be prepared in the same manner as the missing certificate and will bear the same date as the day of examination regardless of when it is issued.

12. COMPLETED MEDICAL EXAMINATION FORMS

All completed medical examination forms must promptly be forwarded to:

Chief, Aeromedical Certification
Branch, AAC-130
Federal Aviation Administration
Post Office Box 26080
Oklahoma City, Oklahoma 73125

13. PROTECTION AND DESTRUCTION OF FORMS

Examiners are cautioned to provide adequate security for blank medical application forms to assure that they do not become available for illegal use. When new or revised medical forms and certificates are issued by the FAA, the old forms and certificates should be destroyed.

14. QUESTIONS OR REQUESTS FOR ASSISTANCE

When an Examiner has a question or needs assistance in carrying out his/her responsibilities, the following individuals should be contacted:

a. Regional Flight Surgeon:

-Questions pertaining to problem medical certification cases in which the Regional Flight Surgeon has initiated action.

-Telephone interpretation of medical standards or policies involving an individual airman whom the Examiner is examining.

-Matters regarding designation and redesignation of Examiners and the Aviation Medical Examiner Program.

-Requests for supplies.

-Attendance at Aviation Medical Examiner Seminars.

b. Chief, Aeromedical Certification Branch, AAC-130:

-Written inquiries concerning guidance on problem medical certification cases.

-Information concerning the overall airman medical certification program.

-Matters involving FAA medical certification of military personnel.

-Information concerning medical certification of applicants in foreign countries.

c. Chief, Aeromedical Education Branch, AAC-140:

-Matters regarding designation and redesignation of International Examiners and military facilities.

-Request for airman medical educational material.

Requests for information should be sent to:

Chief, Aeromedical Education Branch,
AAC-140
Federal Aviation Administration
P. O. Box 25082
Oklahoma City, Oklahoma 73125

15. AIRMAN APPEALS

a. Request for Reconsideration

A denial of a medical certificate by an Examiner is not a final denial by the FAA. An applicant may ask for reconsideration of an Examiner's denial by submitting a request in writing to:

Federal Air Surgeon
Attn: Chief, Aeromedical
Certification Branch, AAC-130
Federal Aviation Administration
Post Office Box 26080
Oklahoma City, Oklahoma 73125

Initial reconsideration will be provided by the Chief, Aeromedical Certification Branch. Some cases may be referred to the appropriate Regional Flight Surgeon for action. If the Chief, Aeromedical Certification Branch or a Regional Flight Surgeon finds that the applicant is not qualified, the applicant is denied and advised of further reconsideration and appeal procedures. These may include reconsideration by the Federal Air Surgeon, petition for exemption, and/or petition for National Transportation Safety Board (NTSB) review.

b. Petition for Exemption from the Regulations

If the FAA issues a final denial, the airman may petition for an exemption from the applicable standards. Petitions for exemption may be submitted in the form of a letter, in duplicate, to:

Department of Transportation
Federal Aviation Administration
Attn: AAM-200
800 Independence Avenue, S.W.
Washington, D.C. 20591

In considering such petitions, the Federal Air Surgeon obtains opinions of consultant medical specialists as considered appropriate and determines whether the grant of an exemption in the particular case would be in the public interest and would not compromise aviation safety, despite a previous finding that the applicant does not meet the prescribed regulatory standards.

c. National Transportation Safety Board (NTSB)

Within 60 days after a final denial of a medical certificate by the FAA, an airman may petition the NTSB for a review. A petition for NTSB review may be submitted in writing to:

National Transportation Safety
 Board
800 Independence Avenue, S.W.
Washington, D.C. 20594

The NTSB is an independent agency of the Federal Government that has the authority to review on appeal the suspension, amendment, modification, revocation, or denial of any certificate or license issued by the Administrator of the FAA. An Administrative Law Judge for the NTSB may hold a formal hearing at which the FAA would present documentary evidence and testimony by medical specialists supporting the denial decision. The petitioner would also be given an opportunity to present evidence and testimony at the hearing.

It must be noted that while an airman has the right to petition the NTSB within 60 days following a final denial under the medical standards of Part 67 of the Federal Aviation Regulations, no similar appeal to the NTSB may be made on the basis of a denial of an exemption. If, following receipt of a final denial under Part 67, the airman wishes to petition the FAA for an exemption, but also wants to reserve the right to review by the NTSB, the airman may submit both petitions and request the NTSB to hold its action in abeyance pending the outcome of the request for exemption. An unfavorable decision concerning a petition for exemption will not be prejudicial in action before the NTSB. In a similar manner, a decision by the NTSB that a petitioner does not meet the medical standards of Part 67 will not adversely affect consideration of a petition for exemption.

CHAPTER 2
APPLICATION FOR MEDICAL CERTIFICATION

GENERAL

Chapter 2 contains guidance for all numbered items on the front of FAA Form 8500-8, Application for Airman Medical Certificate or Airman Medical and Student Pilot Certificate and Report of Medical Examination.

With the exception of the medical certificate (FAA Form 8500-9) and the combined Medical Certificate and Student Pilot Certificate (FAA Form 8420-2), the entire front page of FAA Form 8500-8 is considered to be the application of the airman. Items 1-24 are to be filled in by the applicant in his/her handwriting using a ballpoint pen, exerting sufficient pressure to make legible NCR (no carbon required) imprints upon the Examiner copy of the form.

The Examiner should verify all of the information reported by the applicant in Items 1-8. On occasion, individuals have attempted to be examined in the name of another person. If the applicant is new to the Examiner, and lives or works outside of the area where the Examiner is located, some evidence of positive identification should be requested. If an airman objects to providing identification, the Examiner should not withhold certification for this reason alone, but should report details of the incident promptly to the Aeromedical Certification Branch, AAC-130, or the Regional Flight Surgeon. A refusal to show identification should also be noted on the application form by the Examiner and the form forwarded to the FAA, even if not fully completed.

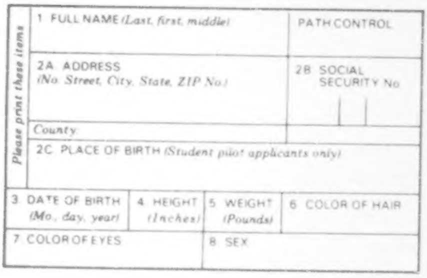
The applicant can refuse to provide his/her Social Security Number (SSN), and failure to do so is not grounds for refusal to issue a medical certificate. All other items on the form must be completed (see Item 2B).

The Examiner should review all items from 1 through 24. A medical certificate should never be issued to an applicant who refuses to answer Items 15, 18, 19, 20, 21, 22, and 23; or to an applicant who refuses to sign the form (Item 24). Items 1-9 are necessary for identification and for issuance of properly completed medical certificates to those who qualify. The date for Item 20 may be estimated if the applicant does not recall the actual date of his/her last examination (see Item 20 below).

The airman must personally enter all data and make all corrections on the application form. Corrections should be initialed by the airman. The application constitutes a legal document and must be completed in the airman's handwriting. If for any reason someone other than the airman enters information under Items 1-24, the applicant should sign his/her initials alongside the information entered (to include any check marks) and the Examiner should add a note explaining the applicant's inability to enter the data. Strict compliance with this procedure is essential if it becomes necessary for the FAA to take legal action for falsification of the application (see Chapter 1).

The box labeled "Path Control" located on the front of the form to the right of Item 1 (name) is for FAA use only.

ITEMS 1-8. Identification



Please print these items

1 FULL NAME *(Last, first, middle)*			PATH CONTROL
2A ADDRESS *(No. Street, City, State, ZIP No.)*			2B SOCIAL SECURITY No
County			
2C PLACE OF BIRTH *(Student pilot applicants only)*			
3 DATE OF BIRTH *(Mo., day, year)*	4 HEIGHT *(Inches)*	5 WEIGHT *(Pounds)*	6 COLOR OF HAIR
7 COLOR OF EYES		8 SEX	

The following information is required for identification of the individual who is making application for medical certification:

1. Full Name

The applicant's last, first, and middle name (or initial if appropriate) should be printed. All applicants without a middle name should enter the letters "NMI" or "NONE." Nick names and abbreviated names should not be used.

2A. Address

The applicant should print his/her permanent mailing address, including the zip code. Since the FAA must maintain a current address for all airmen, the applicant should notify the Chief, Aeromedical Certification Branch, AAC-130, of any change.

2B. Social Security Number (SSN)

While applicants are asked to complete all questions on the face of the application, FAA Form 8500-8, they are not legally required to complete Item 2B. The FAA requests the SSN for identification purposes and record control. The applicant's SSN will not be released by the FAA without written authorization from the individual involved.

2C. Place of Birth

Place of birth information is not a medical requirement and must be entered only when the individual wishes to obtain a Medical/Student Pilot Certificate (FAA Form 8420-2). Instructions for Issuance of a Medical/Student Pilot Certificate are attached to the front of FAA Form 8500-8.

The applicant must indicate whether a white medical certificate (FAA Form 8500-9) or a yellow Medical/Student Pilot Certificate (FAA Form 8420-2) is desired. This is accomplished by checking one of the two boxes at the top right of the application.

3. Date of Birth

Month, day, and year should be entered in order, with the month abbreviated in letters (e.g., Oct. 15, 1932). Name, date of birth, and SSN are the basic identifiers of airmen. When an Examiner wishes to communicate with the FAA concerning an applicant, full name, date of birth, and SSN should be provided if at all possible.

Where the applicant wishes to be issued a Medical/Student Pilot Certificate (FAA Form 8420-2), the Examiner should check the date of birth to ensure that the individual is at least 16 years of age. Unless the applicant is 16 years of age, a combined Medical/Student Pilot Certificate may not be issued, even if he/she will become 16 before the certificate expires. Such a certificate issued by an Examiner will be recalled by the FAA. The applicant must be 16 to be eligible for a student pilot certificate for flight of powered aircraft. This minimum age requirement applies only to the issuance of the yellow FAA Form 8420-2, and never to the issuance of the white medical certificate FAA Form 8500-9. When the applicant is not yet 16 and wishes to solo on his/her 16th birthday, the Examiner should issue a white FAA Form 8500-9 (if fully qualified medically). A student pilot certificate for the flight may be obtained by the applicant from a General Aviation District Office (GADO) or designated Flight Examiner upon presentation of the FAA Form 8500-9 (white medical certificate).

While non-medical regulations allow an airman to solo a glider or balloon at age 14, no medical certificate is required for glider or balloon operations. These airmen are only asked to certify to the FAA that they have no known medical deficiency that makes them unable to pilot a glider.

There is a maximum age requirement for air carrier pilots. Since this is not a medical requirement but an operational one, the Examiner may issue medical certificates without regard to age, to applicants who meet the medical standards.

4. Height

The applicant should record this information in inches. Although there are no medical standards for height, exceptionally short individuals may not be able to reach rudder pedals and must fly specially modified aircraft. If required, the FAA will place operational limitations on their pilot certificate.

The Examiner should verify the height during the course of the medical examination.

5. Weight

The applicant should record his/her weight to the nearest pound and it should be verified by an actual weighing during the course of the examination.

6. Color of Hair

Color of hair should be entered as brown, black, blond, gray, red, or white. No abbreviations or other colors should be used. The information is for identification only.

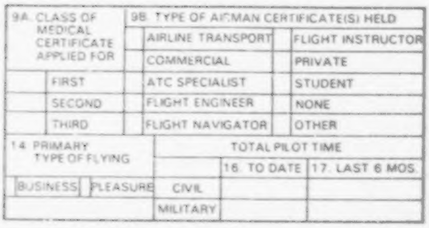
7. Color of Eyes

Color of eyes should be entered as brown, black, blue, hazel, gray, or green. No abbreviations or other colors should be used. This information is for identification only.

8. Sex

The applicant shall enter either male or female.

ITEMS 9A-B, 14, 16-17.
Flight and Occupational Experience



9A. CLASS OF MEDICAL CERTIFICATE APPLIED FOR		9B. TYPE OF AIRMAN CERTIFICATE(S) HELD			
			AIRLINE TRANSPORT		FLIGHT INSTRUCTOR
			COMMERCIAL		PRIVATE
	FIRST		ATC SPECIALIST		STUDENT
	SECOND		FLIGHT ENGINEER		NONE
	THIRD		FLIGHT NAVIGATOR		OTHER

14. PRIMARY TYPE OF FLYING		TOTAL PILOT TIME		
			16. TO DATE	17. LAST 6 MOS.
☐ BUSINESS	☐ PLEASURE	CIVIL		
		MILITARY		

Information provided in these items is obtained for administrative and statistical reasons.

The class of medical certificate sought by the airman is needed so that the appropriate medical standards may be applied. The class of certificate issued must correspond with that applied for.

The applicant may ask for a medical certificate of a higher class than needed for the type of flying or duties currently performed. For example, a student pilot may ask for a first-class medical certificate to see if he/she qualifies medically before entry into an aviation career. The Examiner applies the standards appropriate to the class sought, not to the airman's duties - either performed or anticipated.

This information is also important when an applicant seeks FAA consideration of an Examiner's denial or deferral. Operational experience may be important in determining whether a Statement of Demonstrated Ability ("waiver") may be issued.

9A. Class Applied For

The applicant should check only one block. The Examiner should never issue more than one certificate based upon the same examination (unless given special authorization from the FAA).

9B. Type of Airman Certificate(s) Held

The highest rating of airman certificate should be entered.

14. Primary Type of Flying

The applicant should note whether the majority of flying is for business or for pleasure.

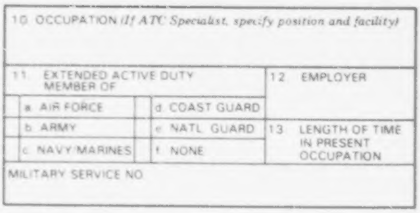
16. Total Pilot Time to Date

Civil and military time are reported separately, and the applicant should indicate whether the time is logged (LOG) or estimated (EST).

17. Total Pilot Time Last 6 Months

Civil and military time are reported separately, and the applicant should indicate whether the time is logged (LOG) or estimated (EST).

ITEMS 10-13. Occupational Experience



10 OCCUPATION *(If ATC Specialist, specify position and facility)*

11 EXTENDED ACTIVE DUTY MEMBER OF
☐ a AIR FORCE
☐ b ARMY
☐ c NAVY/MARINES
☐ d COAST GUARD
☐ e NATL GUARD
☐ f NONE

12 EMPLOYER

13 LENGTH OF TIME IN PRESENT OCCUPATION

MILITARY SERVICE NO

Occupational data are principally used for statistical purposes.

10. Occupation

This should reflect the applicant's major employment. "Pilot" should only be reported when the airman gains his/her livelihood from flying.

11. Extended Active Duty Member Of

This applies only to applicants who are presently members of the armed forces (those on extended active duty) and does not include reservists serving on limited active duty tours.

Military Service Number - This information may be necessary for securing military medical records, if required to determine the applicant's qualifications.

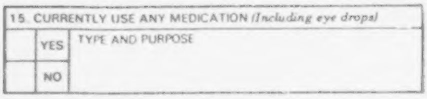
12. Employer

Name of employer.

13. Length of Time in Present Occupation

This refers to the employment noted in Item 12 and should be reported in years.

ITEM 15. Current Use of Any Medication



15. CURRENTLY USE ANY MEDICATION *(Including eye drops)*

☐	YES	TYPE AND PURPOSE
☐	NO	

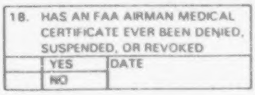
If the applicant checks yes, the type, dosage, and purpose of each medication should be reported.

Any airman who is undergoing continuous treatment with antihistaminic, narcotic, barbiturate, mood-ameliorating, tranquilizing, motion sickness, steroid, antihypertensive, or ataraxic drugs must be denied or issuance deferred unless previously cleared by the FAA. At the time of initial consideration, the Examiner should not issue under any of the above circumstances unless clearance is provided for in the Guide or by other FAA authorization.

During those periods when the foregoing medications are being used for treatment of acute illnesses, the airman is under obligation not to perform the duties of an airman, unless cleared by the FAA.

Further information concerning the use of medication by an applicant may be found elsewhere in this Guide.

ITEM 18. Has an FAA Airman Medical Certificate Ever Been Denied, Suspended, or Revoked

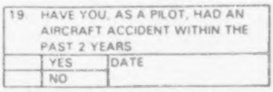


18. HAS AN FAA AIRMAN MEDICAL CERTIFICATE EVER BEEN DENIED, SUSPENDED, OR REVOKED

☐	YES	DATE
☐	NO	

The applicant shall check "yes" or "no." If "yes" is checked, the date of action is to be entered with an explanation reported in the remarks section of Item 21. The Examiner may not issue a medical certificate to an applicant who has checked "yes." The only exceptions to this prohibition are: 1) the applicant presents written evidence from the FAA that he/she was subsequently medically certificated and that an Examiner is authorized to issue a renewal medical certificate to the applicant, or 2) the Examiner obtains oral or written authorization from an FAA medical office to issue a medical certificate.

ITEM 19. Have You as a Pilot Had an Aircraft Accident Within the Past 2 Years?

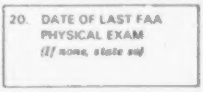


19. HAVE YOU, AS A PILOT, HAD AN AIRCRAFT ACCIDENT WITHIN THE PAST 2 YEARS

☐	YES	DATE
☐	NO	

The applicant shall check "yes" or "no" and, if "yes" is checked, the date of the accident should be entered. If there has been an accident within the past 2 years, the Examiner should question the applicant on this subject, to determine whether the cause might be related to some covert medical problem.

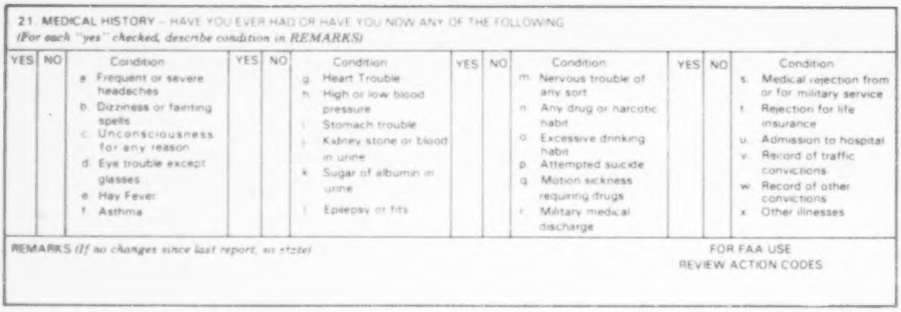
ITEM 20. Date of Last FAA Physical Exam



20. DATE OF LAST FAA PHYSICAL EXAM *(If none, state so)*

If the airman has not made prior application to the FAA for a medical certificate, the word "NONE" should be entered for Item 20. If a prior application was made, a date should be given, even if it is only an estimate of the year. This item should be completed whether the application was made many years ago, or the previous application did not result in the issuance of a medical certificate.

ITEM 21. Medical History



21. MEDICAL HISTORY – HAVE YOU EVER HAD OR HAVE YOU NOW ANY OF THE FOLLOWING
(For each "yes" checked, describe condition in REMARKS)

YES	NO	Condition	YES	NO	Condition	YES	NO	Condition	YES	NO	Condition
		a. Frequent or severe headaches			g. Heart Trouble			m. Nervous trouble of any sort			s. Medical rejection from or for military service
		b. Dizziness or fainting spells			h. High or low blood pressure			n. Any drug or narcotic habit			t. Rejection for life insurance
		c. Unconsciousness for any reason			i. Stomach trouble			o. Excessive drinking habit			u. Admission to hospital
		d. Eye trouble except glasses			j. Kidney stone or blood in urine			p. Attempted suicide			v. Record of traffic convictions
		e. Hay Fever			k. Sugar of albumin in urine			q. Motion sickness requiring drugs			w. Record of other convictions
		f. Asthma			l. Epilepsy or fits			r. Military medical discharge			x. Other illnesses

REMARKS *(If no changes since last report, so state)*

FOR FAA USE
REVIEW ACTION CODES

Instructions for completion of Item 21 are as follows:

21. Medical History. Each item under this heading must be checked either "yes" or "no." The applicant should be reminded that this question refers to any medical condition he/she has ever had. For all items checked "yes," a description of the condition must be given in the "Remarks" section. If the explanation has been given on previous report(s), and there has been no change in the condition, the applicant may state "previously explained, no change." Of particular importance are conditions which have developed since the last FAA medical examination. If more space is needed, a plain sheet of paper should be used bearing the signature of the applicant.

The Examiner must take time before starting the medical examination of the applicant to review the entire front of the FAA Form 8500-8.

In so doing, the Examiner should be personally satisfied that the applicant has checked all of the boxes in Item 21 as either "yes" or "no." The information obtained from this review should be used by the Examiner in asking the applicant pertinent questions during the course of the examination. Certain aspects of the individual's past history may need to be enlarged upon. The Examiner should provide in Item 61 an explanation of the nature of items checked "yes" under Item 21a through 21x. An additional sheet may be added if necessary.

Supplementary reports from the applicant's physicians should be obtained and forwarded to the Aeromedical Certification Branch, AAC-130, when necessary to clarify the significance of an item of history. The responsibility for providing such supplementary reports rests with the applicant. A discussion with the Examiner's Regional Flight Surgeon may clarify and expedite the certification process at this time.

Affirmative answers alone in Item 21 do not constitute a basis for denial of a medical certificate. A decision concerning issuance or denial will be made by applying the medical standards pertinent to the conditions uncovered by this history.

Experience has shown that, when asked a direct question by a physician, applicants are likely to be candid and willing to discuss medical problems.

Less than 1 percent of all applicants are ultimately denied medical certification.

For these reasons, the Examiner should attempt to establish rapport with the applicant and develop a complete medical history. Further, the Examiner should be familiar with FAA certification policies and procedures in order to provide the airman with sound advice.

21a. Frequent or Severe Headaches. A remote history of headaches without sequelae is not disqualifying. Some require only temporary disqualification during periods when the headaches are likely to occur or require treatment. Other types of headaches may preclude clearance by the Examiner and require special evaluation and consideration (e.g., migraine and cluster headaches). Also see Item 46 for a discussion of headaches.

21b. Dizziness or Fainting Spells. One or two episodes of dizziness or even fainting may not disqualify. For example, dizziness upon suddenly arising when ill is not a true dysfunction. Likewise, the orthostatic faint associated with moderate anemia is no threat to aviation safety as long as the individual is temporarily disqualified until the anemia is corrected. Episodic disorders of dizziness or disequilibrium, however, are another matter and these require careful evaluation and consideration by the FAA. Transient processes such as those associated with acute labyrinthitis or benign positional vertigo may not disqualify when fully recovered. Also see Item 46 for a discussion of syncope and vertigo.

21c. Unconsciousness for Any Reason. An unexplained disturbance of consciousness is disqualifying under the medical standards. Since a disturbance of consciousness may be expected to be totally incapacitating, these individuals pose a high risk to safety and must be denied or deferred by the Examiner unless the cause of the disturbance is explained and a loss of consciousness not likely to recur. Further, if surgical treatment was necessary to correct the precipitating cause, the Examiner should defer issuance and submit the application with any available medical records and specialty reports to the Aeromedical Certification Branch, AAC-130. Also see Items 21b (fainting), 21l (epilepsy), and 46 (neurologic).

21d. Eye Trouble Except Glasses. The Examiner should personally explore the past history of the applicant by asking questions concerning any changes in vision, unusual visual experiences (halos, scintillations, etc.) sensitivity to light, injuries, surgery, or current use of medication. Does the applicant report inordinate difficulties with eye fatigue or strain? Is there a family history of serious eye disease such as glaucoma or other disease commonly associated with secondary eye changes such as diabetes? Also see Items 31 through 34, 52, and 55.

21e. Hay Fever. Hay fever controlled solely by desensitization without requiring antihistamines or other medications is not disqualifying. Individuals who have hay fever that requires only seasonal therapy may be certified by the FAA under the stipulation that they not fly during the time when symptoms occur and treatment is required. The Examiner should defer issuance in these cases even though the individual may be asymptomatic when seen for FAA medical examination. The Examiner can assist these applicants by submitting an ancillary report to the Aeromedical Certification Branch, AAC-130, that details the period and duration of symptoms and the nature and dosage of drugs used for treatment and/or prevention. Also see Items 25 through 30, ENT.

21f. Asthma. A history of mild or seasonal asthmatic symptoms is not disqualifying if the applicant otherwise meets the medical standards and currently requires no treatment. Those persons with a history of frequent severe attacks or a need for preventive therapy should be denied. Certificate issuance may be deferred in other cases when it is necessary to gather medical records or specialty examinations. Ancillary documentation is submitted to the FAA for consideration. Specialty reports should detail the frequency and severity of the attacks and the nature and dosage of any medication required for treatment or prevention. Also see Item 35.

21g. Heart Trouble. Because of the possibility of sudden and severe incapacitation, certain heart conditions are disqualifying, based upon history alone, regardless of how remote that history may be. Part 67 of the Federal Aviation Regulations provides that for all classes of airmen, an established medical history or clinical diagnosis of myocardial infarction or angina pectoris or other evidence of coronary heart disease that may be reasonably expected to lead to an infarction is cause for denial. The Examiner may not issue a certificate to an applicant with such a history. The Examiner should issue a letter of denial or if uncertain of the accuracy of the diagnosis, defer action and forward the application to the Chief, Aeromedical Certification Branch, AAC-130. The Examiner should report any available information concerning this history in Item 61 of the application form.

The Examiner should deny or defer issuance to any applicant with a history of arrhythmia except when the disturbance is sinus arrhythmia or occasional ventricular ectopic beats not due to organic heart disease. Also, potentially disqualifying is a history of cardiac decompensation, congenital heart disease with associated abnormalities such as cardiac enlargement, and significant valvular heart disease. The Examiner should assist in the collection of data needed by the FAA where the applicant wishes further consideration for certification. Documentation needed may include hospital and other medical records, a specialty evaluation and certain laboratory tests and special procedures. Specifications for Cardiovascular Evaluation (FAA Form 8500-19) are included in Appendix 2. See also Items 36 and 37.

21h. High or Low Blood Pressure. In the case of high blood pressure, disposition depends upon current blood pressure levels and whether antihypertensive medication is being taken by the applicant. It should also be determined if there is a history of complications, adverse reactions to therapy, hospitalization, etc. Details are given in Item 56.

A history of low blood pressure requires elaboration. If in doubt, it is usually best for the Examiner to defer issuance rather than deny for such a history.

21i. Stomach Trouble. A history of acute gastrointestinal disorders is usually not disqualifying once recovery is achieved.

Many chronic gastrointestinal diseases preclude Examiner issuance (e.g., cirrhosis, malignancy, ulcerative colitis). Colostomy following surgery for cancer may be allowed through special issuance by the FAA.

The most common "stomach trouble" reported is peptic ulcer. The Examiner should not issue a medical certificate if the applicant has a recent history of bleeding ulcers. Otherwise, ulcers must not have been active within the past 3 months or currently require medication other than the occasional use of antacids. Item 38 outlines the special studies needed for consideration of applicants with an ulcer history.

In the case of a history of bowel obstruction, a report must be provided from the treating physician concerning the cause and present status.

21j. Kidney Stone or Blood in Urine. An Examiner may not issue a medical certificate to an applicant with a history of renal stones. A specialty evaluation and special studies are usually required if the applicant desires further consideration by the FAA. Due to the incapacitation that can occur over a relatively short period of time, information concerning the likelihood of recurrence is essential to favorable consideration.

Other significant renal history is discussed in Item 41.

21k. Sugar or Albumin in Urine. A finding of glycosuria or proteinuria at the time of examination is cause for deferral by the Examiner. The cause should be determined either by report from the treating physician or by current studies designed to assure the absence of diabetes, significant urinary tract disease, or other organic disease.

Diabetes mellitus requiring hypoglycemic drugs for control is disqualifying. A past history of need for hypoglycemic medication may not be disqualifying. Those applicants with a "past" history of diabetes and those currently under control by dietary measures alone should be deferred and forwarded to the Aeromedical Certification Branch, AAC-130, for further evaluation. The Examiner can help to expedite the FAA review by assisting the applicant in the gathering of medical records and the submission of a current specialty report. See Item 40.

21l. Epilepsy or Fits. An established diagnosis is cause for denial no matter how remote the history. While the likelihood for certification is poor, and final action may involve several appeal procedures, the Examiner can assist the applicant who wishes further consideration by helping to acquire all past records. The first step in the review process involves a determination as to whether the diagnosis of epilepsy is medically and legally sound.

The term "fits" has a broader meaning than epileptic seizures alone. For example, delirium tremens associated with alcohol abuse may be cause for an affirmative answer to Item 21l. This history is also cause for deferral or denial by the Examiner.

21m. Nervous Trouble of Any Sort. The term "nervous" will normally mean psychiatric or emotional illness to the applicant. To a few it may include neuromuscular disorders. The presence of some organic disorders may only be known through the "nervousness" that results (e.g., hyperthyroidism).

An affirmative answer to Item 21m requires investigation through supplemental history taking. Dispositions will vary according to the details obtained. The applicant with an established history of psychosis must be denied by the Examiner without exception. Also see Items 46 and 47.

21n. Any Drug or Narcotic Habit. The Examiner must deny any applicant with an established history of drug dependence, no matter how remote that history may be. The term "drug dependence" is defined in the regulation.

The past use of marijuana is not cause for Examiner denial for "drug dependence" (see Item 47). If in doubt as to the significance of any drug "habit" to aviation safety, the Examiner should not hesitate to defer and send the application to the FAA for further consideration. Any applicant denied or deferred because of a drug history can be assisted by the Examiner if documents relating to the history are acquired for FAA review. If over 2 weeks delay is anticipated in acquiring these records, the completed FAA Form 8500-8 should be forwarded to the FAA with a notation that medical records will be sent under separate cover.

21o. Excessive Drinking Habit. A history of alcoholism is cause for Examiner denial regardless of how remote that history may be. The term "alcoholism" is defined in the regulation (see Item 47). Excessive use of alcohol or alcohol abuse is not always considered to be synonymous with "alcoholism." The episodic drinker may drink in excess on infrequent occasions without necessarily meeting the criteria for "alcoholism." If in doubt about the diagnosis of alcoholism having been "established" medically, the Examiner should defer rather than deny. In all cases of alcoholism and alcohol abuse (excessive alcohol use or drinking habit) the Examiner can assist the applicant who wishes further consideration by helping to gather all pertinent medical records for FAA review.

21p. Attempted Suicide. A history of suicidal attempts or suicidal gestures requires special evaluation. The ultimate decision as to eligibility for medical certification rests with the FAA. The Examiner should take a supplemental history as indicated, assist in the gathering of all medical records related to the incident(s) and, if the applicant agrees, assist in obtaining psychiatric and/or psychological examinations (see Item 47).

21q. Motion Sickness Requiring Drugs. A careful supplemental history is indicated when the applicant responds affirmatively to this item. Since motion sickness varies with the nature of the stimulus, it is most helpful to know if the problem has occurred in flight or under similar circumstances. If in doubt or if medication is repeatedly required, the Examiner should deny or defer issuance. Supplemental history concerning the nature of the sickness, frequency, and need for medication should be reported under Item 61.

21r. Military Medical Discharge. If the applicant has received a military medical discharge, the Examiner should take additional history, recording it under Item 61. It is helpful to know the circumstances surrounding the discharge, including dates, and whether the individual is receiving disability compensation. If the applicant is receiving veteran's disability benefits, the claim number and service number are helpful in obtaining copies of pertinent medical records. The fact that the applicant is receiving disability benefits does not necessarily mean that the application should be denied.

21s. Medical Rejection From, or for, Military Service. The Examiner should inquire as to place, cause, and date and enter the information under Item 61. It is of great help to the applicant and the FAA if the Examiner can help obtain copies of military documents for attachment to the FAA Form 8500-8. If a delay of over 2 weeks is expected, the Form 8500-8 should be forwarded to the FAA with a note specifying what documents will be forwarded later under separate cover.

21t. Rejection for Life Insurance. The Examiner should inquire regarding the circumstances. The supplemental history should be recorded under Item 61. Disposition will depend upon whether the medical condition involved is present or whether any history of such a condition requires denial under the medical standards.

21u. Admission to Hospital. For each admission the dates, diagnoses, duration, treatment, name of the attending physician, and complete address of the hospital or clinic should be listed. If previously reported, the applicant may enter "previously reported, no change." A history of hospitalization does not disqualify although the medical condition that resulted in hospitalization may.

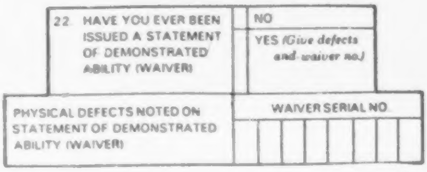
21v. Record of Traffic Conviction. The applicant must report all moving vehicle convictions. Since not all citations result in convictions, only the convictions are reported. If there have been no new convictions since the last application, the airman may enter, "previously reported, no change."

Traffic convictions do not disqualify but they may raise questions about the applicant's fitness for certification (see Item 47). Repeated convictions related to alcohol may raise a suspicion of alcoholism.

21w. Record of Other Convictions. The applicant must report date, place, and circumstances for each. The comments under 21v apply equally here.

21x. Other Illnesses. The applicant should describe the nature of these illnesses under the Remarks section of Item 21. If additional records, tests, or specialty reports are necessary in order to make a certification decision, the applicant should be advised. If the applicant does not wish to provide the information suggested by the Examiner, the Form 8500-8 should be forwarded to the FAA without certificate issuance. If the applicant wishes to have the FAA review the application and decide what ancillary documentation is needed, the Examiner defers issuance of the medical certificate and forwards the completed form to the FAA. Where the Examiner proceeds to obtain documentation, and all data will not be received within 2 weeks, Form 8500-8 should be sent immediately to the Aeromedical Certification Branch, AAC-130, with a note that additional documents will be forwarded later under separate cover.

ITEM 22. Have You Ever Been Issued a Statement of Demonstrated Ability?



22 HAVE YOU EVER BEEN ISSUED A STATEMENT OF DEMONSTRATED ABILITY (WAIVER)	☐	NO
	☐	YES *(Give defects and waiver no.)*
PHYSICAL DEFECTS NOTED ON STATEMENT OF DEMONSTRATED ABILITY (WAIVER)	WAIVER SERIAL NO.	

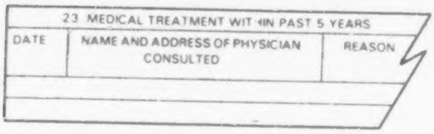
The applicant is instructed to check "yes" or "no." If "yes" is checked the Statement of Demonstrated Ability serial number should be entered.

Statements of Demonstrated Ability are valid for an indefinite period or until an adverse change occurs that results in a level of defect worse than that stated on the face of the document.

Statements of Demonstrated Ability are issued by the FAA for certain functional static defects, but not for disqualifying conditions that may be progressive. The extent of the functional loss that has been cleared by the agency is stated on the face of the form and, if the Examiner finds the condition has become worse, a medical certificate should not be issued even if the applicant is otherwise qualified. The Examiner should also defer issuance if it is unclear whether the applicant's present status represents an adverse change.

The Examiner must take special care not to issue a medical certificate of a class higher than that specified on the face of the Statement of Demonstrated Ability - even if the applicant appears to be otherwise medically qualified.

ITEM 23. Medical Treatment Within Past 5 Years



23 MEDICAL TREATMENT WITHIN PAST 5 YEARS

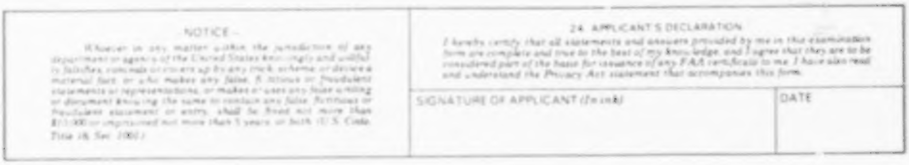
DATE	NAME AND ADDRESS OF PHYSICIAN CONSULTED	REASON

The applicant is instructed to list all conditions for which a physician was consulted, giving the date and the address of the physician or hospital, and briefly stating the reason for the consultation.

To achieve full disclosure of recent medical history, the term "physician" should be interpreted broadly - including anyone who evaluates and/or treats patients for a fee. Contacts should be reported even when there was no treatment in the usual sense of the word (e.g., a physical check-up or counseling for alcohol abuse).

If an explanation has been given on previous report(s) and there has been no change in the condition, the applicant may enter "previously explained, no change." Of particular importance is the reporting of conditions which have developed in the interim since the applicant's last FAA medical examination. The Examiner is asked to comment on entries not "previously explained." These comments may be entered under Item 61 or placed upon a supplemental sheet and attached to the FAA Form 8500-8.

ITEM 24. Applicant's Declaration



- NOTICE -

Whoever in any matter within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals or covers up by any trick, scheme or device a material fact, or who makes any false, fictitious or fraudulent statements or representations, or makes or uses any false writing or document knowing the same to contain any false, fictitious or fraudulent statement or entry, shall be fined not more than $10,000 or imprisoned not more than 5 years or both. (U.S. Code, Title 18, Sec. 1001.)

24. APPLICANT'S DECLARATION

I hereby certify that all statements and answers provided by me in this examination form are complete and true to the best of my knowledge, and I agree that they are to be considered part of the basis for issuance of any FAA certificate to me. I have also read and understand the Privacy Act statement that accompanies this form.

SIGNATURE OF APPLICANT *(In ink)*	DATE

The applicant should be instructed to sign Item 24 after reading the declaration. The signature should be in ink. If an applicant for any reason is unable or refuses to sign the declaration, a medical certificate should not be issued.

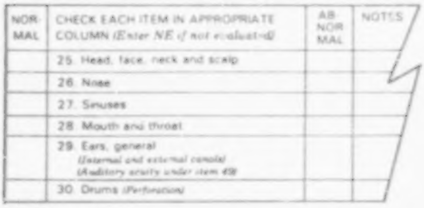
CHAPTER 3

Examination Techniques & Criteria for Qualification
Items 25-48 of FAA Form 8500-8

This chapter provides guidance for completion of Items 25-48 of the Application For Airman Medical Certificate or Airman Medical And Student Pilot Certificate, FAA Form 8500-8. The Examiner will personally conduct the examinations required for the completion of these items.

The Examiner must carefully read the front of FAA Form 8500-8 (Items 1-24) prior to proceeding with the completion of the reverse of the form. This will alert the Examiner to possible pathological findings.

ITEMS 25-30. Ear, Nose and Throat (ENT)



NORMAL	CHECK EACH ITEM IN APPROPRIATE COLUMN *(Enter NE if not evaluated)*	ABNORMAL	NOTES
	25. Head, face, neck and scalp		
	26. Nose		
	27. Sinuses		
	28. Mouth and throat		
	29. Ears, general *(Internal and external canals)* *(Auditory acuity under item 49)*		
	30. Drums *(Perforation)*		

I. FEDERAL AVIATION REGULATIONS

A. First- and Second-Class: FAR 67.13(c), 67.15(c)

***No acute or chronic disease of the middle or internal ear.

***No disease of the mastoid.

***No unhealed (unclosed) perforation of the eardrum.

***No disease or malformation of the nose or throat that might interfere with, or be aggravated by flying.

***No disturbance of equilibrium.

B. Third-Class: FAR 67.17(c)

***No acute or chronic disease of the internal ear.

***No disease or malformation of the nose or throat that might interfere with, or be aggravated by, flying.

*No disturbance in equilibrium.

II. EXAMINATION PROCEDURES

A. Equipment

It will be necessary to have at least an otoscope, nasal speculum, tongue blades, and laryngeal mirror. The otoscope light can serve as a transilluminator. Some Examiners may find that a solution of .25% phenylephrine hydrochloride and cotton swabs are sometimes useful. Those Examiners trained in use of the head mirror and wire ear loop may also find these useful for the removal of cerumen deposits.

Conditions which call for evaluation with a nasopharyngoscope, cannula, curette, irrigation device, or suction device may best be referred to an ENT specialist.

B. Examination Techniques

1. The head should be examined to determine the presence of any significant defects such as:

a. Bony defects of the skull.
b. Gross deformities.
c. Fistulas.
d. Evidence of recent blows or trauma to the head.
e. Limited motion of the head and neck.

2. The external ear is seldom a major problem in the medical certification of airmen. Otitis externa or a furuncle may call for temporary disqualification. Obstruction of the canal by impacted cerumen or cellular debris may indicate a need for referral to an ENT specialist for examination.

The tympanic membranes should be examined for scars or perforations. Discharge or granulation tissue may be the only observable indication of perforation. Middle ear disease may be revealed by retraction, fluid levels, or discoloration. The normal color of the drum is pearly grey and the normal drum is moveable. Mobility should be demonstrated by watching the drum through the otoscope during a valsalva maneuver.

3. In the middle ear the only evidence of a smoldering otitis media may be slight stuffiness of the ears and a hearing loss. An upper respiratory infection, with difficulty in aeration of the middle ear or otitis, greatly increases the risk of aerotitis media with pain, deafness, tinnitus, and vertigo. When the applicant is taking medication for an ENT condition, it is important that the Examiner become fully aware of the underlying pathology, present status, and the length of time the medication has been used. If the condition is not a threat to aviation safety, the treatment consists solely of antibiotics, and they have been taken over a sufficient period to rule out the likelihood of adverse side effects, the Examiner may make the certification decision. The same approach should be taken when considering the significance of prior surgery--such as myringotomy, mastoidectomy, or tympanoplasty. When in doubt do not hesitate to defer issuance and refer the matter to the Aeromedical Certification Branch, AAC-130. The FAA has available the services of consultant ENT specialists to help in determining the safety implications of complicated conditions. For details concerning otosclerosis surgery, see Item 49.

4. The nose should be examined for the presence of polyps, blood, or signs of infection or allergy. The Examiner should determine if there is a history of epistaxis with exposure to high altitudes and if there is any indication of loss of sense of smell (anosmia). Polyps may cause airway obstruction or sinus blockage. Infection or allergy may be cause for obtaining additional history. Anosmia is at least noteworthy in that the airman should be made fully aware of the significance of the handicap in flying (inability to receive early warning of gas spills, oil leaks, or smoke).

5. Evidence of sinus disease must be carefully evaluated by a specialist because of the risk of sudden and severe incapacitation from barotrauma.

6. The mouth and throat should be examined to determine the presence of active disease that is progressive or may interfere with voice communications. Gross abnormalities should be identified that could interfere with the use of

personal equipment such as oxygen equipment.

7. The larynx should be visualized if the applicant's voice is rough or husky. Acute laryngitis is temporarily disqualifying. Chronic laryngitis requires further diagnostic workup. Any applicant seeking certification for the first time after laryngeal surgery or who uses an artificial voice-producing device should be carefully assessed to assure intelligibility of voice communications. If there is any question concerning intelligibility, the Examiner should not issue the certificate and should forward the application and available clinical information to the Aeromedical Certification Branch, AAC-130.

III. DISPOSITION

The following conditions are disqualifying for issuance of a medical certificate by the Examiner. These disqualifying defects are subject to further consideration by the FAA. The list is not comprehensive and other ENT conditions that may interfere with the safe operation of an aircraft are also disqualifying.

A. Item 25 - Head, Face, Neck, and Scalp.

1. Fistula of neck, either congential or acquired, to include tracheostomy.

2. Loss of bony substance involving the two tables of the cranial vault.

3. Deformities of face or head which would interfere with wearing and proper fitting of an oxygen mask (certification by the FAA is possible with operational limitations).

B. Item 26 - Nose.

1. Evidence of allergic rhinitis.

2. Malformations which would prevent nasal respiration.

3. Obstruction of sinus ostia, including polyps, which would be likely to result in complete closure under conditions to which airmen are exposed.

C. Item 27 - Sinuses.

1. Sinusitis: Acute or chronic.

2. Tumor.

D. Item 28. Mouth and Throat.

1. Palate: Extensive adhesion of the soft palate to the pharynx.

2. Any malformation or condition including stuttering, which would impair voice communication. (See Item 47.)

E. Item 29 - Ears, General.

1. Inner ear: Acute or chronic disease which may disturb equilibrium.

2. Mastoids:

a. Mastoiditis, acute or chronic.

b. Mastoid fistula.

3. Middle ear:

a. Otitis media, serous or suppurative, acute or chronic.

b. Impaired aeration.

4. Outer ear:

a. Otitis externa which may progress to impaired hearing or become incapacitating.

b. Impacted cerumen until removed.

F. Item 30 - Drums.

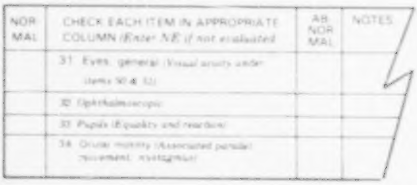
1. For first- and second-class applicants any perforation. For third-class applicants, if associated with active infection.

2. Severe retraction.

Some ENT conditions known only through history may also be disqualifying--see, for example, Item 21 (Medical History).

Some conditions may have several possible causes or exhibit multiple symptomatology. An example would be disturbance in equilibrium. Although ENT conditions are a possible cause, the principal discussion will be found in the Neurological sections of the Guide.

ITEMS 31-34. EYE



NORMAL	CHECK EACH ITEM IN APPROPRIATE COLUMN *(Enter NE if not evaluated*	ABNORMAL	NOTES
	31. Eyes, general *(Visual acuity under Items 50 & 51)*		
	32. Ophthalmoscopic		
	33. Pupils *(Equality and reaction)*		
	34. Ocular motility *(Associated parallel movement, nystagmus)*		

I. FEDERAL AVIATION REGULATIONS

A. First-Class: FAR 67.13(b)(5)

***No acute or chronic pathological condition of either eye or adnexae that might interfere with its proper function, might progress to that degree, or might be aggravated by flying.

B. Second-Class: FAR 67.15(b)(4)

***No pathology of the eye.

C. Third-Class: FAR 67.17(b)(2)

***No serious pathology of the eye.

For further evaluation of the eyes see Items 50 and 51, visual acuity; Item 52, intraocular pressure; Item 53, color vision; Item 54, visual fields; and Item 55, phorias.

II. EXAMINATION PROCEDURES

A. Equipment

For evaluation of the eye as required by Items 31-34, the Examiner needs only a quality ophthalmoscope and an otoscope to use as a point light source of moderate intensity. A single instrument such as an oto-ophthalmoscope with interchangeable heads is an acceptable alternative.

B. Examination Techniques

1. The examination of the eyes should be directed toward the discovery of those deformities due to heredity, injury, disease, or the aging process which may cause a failure in visual function while flying, or discomfort sufficient to interfere with safely performing airman duties.

a. Have you noticed any recent changes in the sharpness of your vision?

The aviation-oriented physician, in recognizing the stresses of flight and other airman duties, is best equipped to seek clues of fatigue in visual effort. Is it time to suggest the wearing of reading glasses? A history of momentary loss of vision may imply impending cerebrovascular accident. Blurring of vision from diplopia may indicate myasthenia gravis or multiple sclerosis.

b. Have you experienced any blind spots in your vision, halos around bright lights, spots before your eyes, or any other unusual visual experience?

In addition to retinal and optic tract lesions, there may be sparkling of vitreous cholesterol crystals (spintherism) or scintillating scotomas (migraine). It may be useful to ask if the applicant can see as well as his acquaintances at night. Severely reduced night vision may be an important consideration especially in the initial examination of a young airman.

c. Have you recently noticed itching or burning of your eyes or increased sensitivity to bright lights or to glare?

Simple burning or itching of the eyes may serve as an early clue to the existence of allergic conditions affecting the eyes, of inflammatory diseases due to infection, and possibly to the onset of serious eye pathology such as uveitis or glaucoma. Increased sensitivity to glare may also alert the Examiner to search for uveitis or for cataracts.

d. Have you noticed any eye discharge lately, especially early in the morning before washing your face?

Even low grade infections of the external eye may cause irritation or blepharospasm, and have an adverse effect on the applicant's ability to fully concentrate on his/her duties. Have drugs been prescribed for the condition?

e. Does the room ever seem to jerk or spin or do you ever feel that you are spinning or are about to faint?

Nystagmus of recent onset requires specialty evaluation. The importance of dizziness or vertigo in airmen justifies further inquiry.

f. Are you currently taking any drugs/ medication?

The Aeromedical Certification Branch, AAC-130, has found that when the Examiner asks the applicant this question it commonly leads to revelations not made in any other way. Many problems requiring the attention of the FAA (and further delay in the processing of applications) relate to the failure of the applicant and/or the Examiner to fully disclose and explain medications presently in use.

2. It is recommended that the following signs be considered during the course of examination:

a. Color - redness of allergy, glaucoma, infection, or trauma; yellow of jaundice; and the green or brown Kayser-Fleischer Ring of Wilson's disease.

b. Swelling - abscess, allergy, cyst, exophthalmos, myxedema, tumor.

c. Other - clarity, discharge, dryness, ptosis, spasm(tic), tropion, ulcer.

3. Ophthalmoscopic

It is suggested that a routine be established for ophthalmoscopic examinations to aid in the conduct of a comprehensive assessment of the eye. Routine use of a mydriatic is not recommended.

a. Cornea - observe for abrasions, calcium deposits, contact lenses, dystrophy, keratoconus, pterygium, scars, or ulceration. Contact lenses should be removed several hours before examination of the eye (see Item 50).

b. Pupils and Iris - check for the presence of synechiae and uveitis. Size, shape, and reaction to light should be evaluated during the ophthalmoscopic examination. Observe for disparity in size or reaction to light (Horner's Syndrome); Argyll Robertson Pupil); coloboma.

c. Aqueous - hyphema or rheumatoid iridocyclitis.

d. Lens - is there aphakia, discoloration, dislocation, cataract, or an implanted lens?

e. Vitreous - note discoloration, hyaloid artery, floaters, or strands.

f. Optic nerve - observe for atrophy, cupping, papilledema.

g. Retina and choroid - examine for evidence of coloboma, choroiditis, detachment of the retina, retinitis, retinitis pigmentosa, retinal tumor, senile macular or other degeneration, toxoplasmosis, etc.

4. Ocular Motility

Motility may be assessed by having the applicant follow a point light source with both eyes, the Examiner moving the light into right and left upper and lower quadrants while observing the individual and the conjugate motions of each eye. The light is then brought to center front and advanced toward the nose, observing for convergence. End point nystagmus is a physiologic nystagmus and not considered to be significant. It need not be reported. See Item 50 for further consideration of nystagmus.

III. DISPOSITION

When present at the time of examination, the following conditions are disqualifying for issuance of a medical certificate. All disqualifying defects are subject to further consideration by the FAA when requested by the applicant. Further, these lists are not comprehensive and there are other findings which may also warrant disqualification.

This section of the Guide applies to those findings observed by the Examiner. Functional testing of the eyes is covered in Items 50 through 55 and history in Item 21.

A. Item 31. EYES, GENERAL.

1. Hereditary, congenital, or acquired conditions, whether acute or chronic, of either eye or adnexa, which may interfere with visual functions, may progress to that degree, or may be aggravated by flying (i.e., tumors and ptosis obscuring the pupil, acute inflammatory disease of the eyes and lids).

2. Any condition not currently symptomatic but prone to become worse or recur with functional loss or acute symptoms that would be incapacitating or cause significant decrements in operational efficiency (i.e., retinal detachment, optic neuritis, chorioretinitis).

3. Any ophthalmic pathology reflecting a serious systemic disease (e.g., diabetic and hypertensive retinopathy).

B. Item 32. INTRAOCULAR

1. Corneal ulcer or dystrophy.

2. Aphakia; lens displacement or lens implant; cataract.

3. Chorioretinitis; coloboma.

4. Retinal detachment; retinal degeneration; retinitis pigmentosa.

5. Papilledema; optic atrophy; optic neuritis.

6. Macular degeneration; macular detachment.

7. Vascular occlusion; retinopathy.

8. Tumors.

9. Glaucoma (treated or untreated).

C. Item 33. PUPILS

1. Synechiae, anterior or posterior.

2. Nonreaction to light in either eye.

3. Disparity in size or reaction to light requires clarification and/or further evaluation.

4. Nystagmus.

D. Item 34. OCULAR MOTILITY

1. Paralysis with loss of ocular motion in any direction.

2. Absence of conjugate alignment in any quadrant.

3. Inability to converge on a near object.

Applicants with many of the foregoing conditions may be found qualified for certification by the FAA following receipt and review of specialty evaluations and pertinent medical records. Examples include applicants who have undergone cataract surgery with or without lens implant, retinal detachment with surgical correction, open angle glaucoma under adequate control with medication, and narrow angle glaucoma following surgical correction. Although the Examiner may not issue a certificate under such circumstances, consideration by the FAA may be expedited by the collection of pertinent medical records and securing a current ophthalmologic evaluation using FAA Form 8500-7, as appropriate. If there is a question regarding the need for a current specialty evaluation, the Examiner should not obtain the evaluation but refer the completed application form (8500-8) and any available medical records to the Aeromedical Certification Branch, AAC-130.

ITEMS 35-37. CARDIOPULMONARY

NORMAL	CHECK EACH ITEM IN APPROPRIATE COLUMN *(Enter NE if not evaluated)*	ABNORMAL	NOTES
	35. Lungs and chest *(including breasts)*		
	36. Heart *(Thrust, size, rhythm, sounds)*		
	37. Vascular system		

I. FEDERAL AVIATION REGULATIONS

A. First-Class: FAR 67.13(e)(5)

***If the applicant is at least 40 years of age, he must show a degree of circulatory efficiency that is compatible with the safe operation of aircraft at high altitutes.

B. All Classes: FAR 67.13, .15, and .17 (e)(1)

***No established medical history or clinical diagnosis of --

Myocardial infarction; or

Angina pectoris or other evidence of coronary heart disease that the Federal Air Surgeon finds may reasonably be expected to lead to myocardial infarction.

C. All Classes: FAR 67.13, .15, and .17 (f)(2)

***No other organic, functional, or structural disease, defect, or limitation that the Federal Air Surgeon finds --

Makes the applicant unable to safely perform the duties or exercise the privileges of the airman certificate that he holds or for which he is applying; or

May reasonably be expected, within 2 years after the finding, to make him unable to perform those duties or exercise those privileges;

and the findings are based on the case history and appropriate, qualified, medical judgment relating to the condition involved.

See also Items 56 (blood pressure), 57 (pulse), and 59 (ECG) for other regulations concerning the cardiovascular system.

II. EXAMINATION PROCEDURES

A. Equipment

For the conduct of the medical examination applicable to Items 35-37, the only necessary equipment is an examining table and a good stethoscope. History or current findings may indicate a need for special evaluations.

B. Examination Techniques

It is helpful to follow a set routine of examination much as the pilot uses a check list. One approach is as follows:

1. Inspection. Observe and report any thoracic deformity (e.g., pectus excavatum), signs of surgery or other trauma, and clues to ventricular hypertrophy. Check the hematopoietic and vascular system by observing for palor, edema, varicosities, stasis ulcers, and venous distention. Check the nail beds for capillary pulsation and color.

2. Palpation. Check for thrills and the vascular system for arteriosclerotic changes, shunts or A/V anastomoses. The pulses should be examined to determine their character, to note if they are diminished or absent, and to observe for synchronicity.

3. Percussion. Determine heart size, diaphragmatic elevation/excursion, abnormal densities in the pulmonary fields, and mediastinal shift.

4. Auscultation. Check for resonance, asthmatic wheezing, ronchi, rales, cavernous breathing of emphysema, pulmonary or pericardial friction rubs, quality of the heart sounds, murmurs, heart rate, and rhythm. If a murmur, report its character, loudness, timing, transmission, and change with respiration. Auscult the neck for bruit. It is recommended that the auscultation of the heart be conducted with the applicant in sitting and in lying positions.

Aside from murmur, irregular rhythm, and enlargement, the Examiner should be careful to observe for those specific signs which are pathognomonic for specific disease entities or for serious generalized heart disease. Examples of such evidence are (1) the opening snap at the apex or 4th left intercostal space signifying mitral stenosis, (2) gallop rhythm indicating serious impairment of cardiac function, (3) the middiastolic rumble of mitral stenosis.

III. DISPOSITION

The following conditions are disqualifying for the issuance of a medical certificate by the Examiner. The applicant may receive further consideration by the FAA upon making a written request for reconsideration. This list is not comprehensive and other heart, lung, and vascular findings may also be disqualifying.

A. Lungs and Chest, Item 35.

1. Asthma.

2. Bronchiectasis, if more than mild.

3. Emphysema, if of sufficient degree to be symptomatic.

4. Fibrosis, if of sufficient degree to interfere with pulmonary function.

5. Fistula, bronchopleural, to include thoracostomy.

6. Infectious disease of the lung, pleura, or mediastinum:

a. Abscesses.
b. Mycotic disease with or without cavitation.
c. Tuberculosis in active form and until considered arrested.

7. Lobectomy, until 6 months after surgery at which time the hospital records and results of pulmonary function tests will be obtained and forwarded to the Aeromedical Certification Branch.

8. Pleura and pleural cavity:

a. Acute fibrinous pleurisy.

b. Pleurisy with effusion.

c. Empyema.

9. Pneumonectomy.

10. Pneumothorax:

a. Artificial, until 6 months after cessation of therapy.
b. Spontaneous, until resolved as demonstrated by X-ray, and until it is determined that no condition is present which would be likely to cause recurrence.

11. Sarcoid, if more than minimal involvement or if symptomatic.

12. Malignant tumors or cysts of the lung, pleura, mediastinum, or the breast.

13. Other diseases or defects of the lungs or chest wall which require use of medication or which could adversely affect flying or endanger the individual's well-being if permitted to fly.

B. Heart, Item 36.

1. Myocardial infarction, angina pectoris, or other evidence of coronary heart disease. Reports and test results relating to the diagnosis must be obtained and forwarded to the Aeromedical Certification Branch, AAC-130.

2. Arrhythmia will be evaluated in accordance with the procedure outlined in paragraph 9 below. Arrhythmias caused by organic heart disease and functional arrhythmias,

other than sinus arrhythmia or occasional ventricular or atrial ectopic beats, are disqualifying.

3. Cardiac decompensation.

4. Congenital heart disease accompanied by cardiac enlargement, ECG abnormality, or evidence of inadequate oxygenation.

5. Hypertrophy or dilatation of the heart as evidenced by clinical examination and supported by electrocardiographic and X-ray examination.

6. Murmur will be evaluated in accordance with the procedure outlined in paragraph 9 below.

7. Pericarditis, endocarditis, or myocarditis.

8. Valvular disease of the heart will be evaluated in accordance with the procedures outlined in paragraph 9 below. Certification must be denied when any of the following diagnoses has been established:

a. Aortic stenosis and/or aortic regurgitation.
b. Mitral stenosis.
c. Mitral insufficiency.

9. When cardiac arrhythmia, cardiac murmur, hypertension, enlargement, or other evidence of cardiovascular abnormality is found, issuance is deferred. If the applicant wishes further consideration, a consultation will be required from a specialist in internal medicine or cardiology (see FAA Form 8500-19). It must include a narrative report of his/her evaluation and be accompanied by an electrocardiographic tracing, laboratory results, and chest X-ray. The report and accompanying material should be forwarded to the Aeromedical Certification Branch, AAC-130. See Item 59 for detail regarding ECGs.

C. Vascular System, Item 37.

1. Aneurysm or arteriovenous fistula.

2. Blood and blood-forming tissue disease:

a. Anemia when the hemoglobin is lower than 12 gms/100 cc blood.
b. Hemophilia.
c. Leukemia.
d. Polycythemia.
e. Other disease of the blood or blood-forming tissues which could adversely affect performance of airman duties.

3. Peripheral edema: results of studies to determine the cause will be obtained and forwarded to the Aeromedical Certification Branch, AAC-130.

4. Peripheral vascular disease:

a. Arteriosclerotic vascular disease with evidence of circulatory obstruction.
b. Buerger's disease.
c. Intermittent claudication.
d. Raynaud's disease, or phenomenon.
e. Thrombophlebitis, or phlebothrombosis.

5. Syncope, threatened or actual during examination.

Some respiratory, cardiac, and vascular conditions discerned solely by history may be disqualifying (see Item 21). Other conditions in these categories may produce clinical patterns that demand consideration of multiple etiologies. For example, syncope may involve cardiovascular, neurological, and psychiatric factors. See Item 46 for detailed considerations of syncope.

The Examiner should keep in mind some of the special cardiopulmonary demands of flight. Heart rates at take-off and landing sometimes approach age-related maximum heart rates. High G-forces of aerobatics or agricultural flying may stress both systems considerably. Like hypoxia, degenerative changes are often silent, yet they produce subtle performance decrements that may require special investigative techniques to determine health status.

The insidious as well as the overt incapacitations that originate from the cardiopulmonary system make the assessment by the Examiner a very important one to aviation safety. The demands upon the Examiner are clear.

D. Asthma

Except for a history of mild asthmatic symptoms, the Examiner should defer issuance and send the completed report to the Aeromedical Certification Branch, AAC-130, for further evaluation and decision.

Where there is an established diagnosis of moderate or severe asthma, the FAA will usually ask for a report of evaluation by a medical specialist which includes the extent of the disease, medications required, and appropriate pulmonary function studies. Each case is evaluated on an individual basis and when found qualified by the FAA, a certificate is issued. It may bear certain restrictions and special followup evaluations may be required.

When the applicant has asthma that requires use of medication, a report from the treating physician is necessary:

1. Type and dosage of medication.

2. Any side effect.

3. Duration of present therapy.

4. Nature and severity of any residual symptoms.

5. Likelihood for incapacitation.

E. Coronary Heart Disease

Some individuals with a history of myocardial infarction, angina pectoris, or other evidence of coronary heart disease (including coronary artery bypass or revascularization surgery) that may be expected to lead to a myocardial infarction have been granted limited medical certificates through the appeal procedure called a "petition for exemption" (see Chapter 1 of this Guide). The Federal Aviation Regulations, Part 67, specify that a history or clinical diagnosis of the above conditions is cause for denial no matter how remote that history is or whether the applicant is symptomatic. The requirement for a denial applies not only to the Examiner but also to the Federal Air Surgeon and his staff. It is only through the comprehensive assessment generated through a petition for exemption that the individual may be considered for certification.

A petitioner's chances for a favorable exemption decision depend upon many factors as evaluated by medical specialists who advise the Federal Air Surgeon. Flight Operations personnel may also be consulted in those situations where operational limitations must be considered in the interest of aviation safety.

While it is not required that a petitioner submit an Application and Report of Medical Examination, FAA Form 8500-8, as part of the initial petition for an exemption, it is recommended that he/she first contact an Examiner to gather the following data for submission to the Aeromedical Certifiction Branch, AAC-130:

1. A current completed FAA Form 8500-8 (with denial or deferral).

2. A signed and dated Release of Medical Information, FAA Form 8500-21, provided by the Examiner. These forms should be a part of the standard FAA supplies kept by each Examiner.

3. If not previously provided to the FAA, complete pertinent hospital and other medical records to include admission and discharge summaries, daily progress notes, copies of all electrocardiograms and laboratory reports, and outpatient progress notes. Where surgery is involved, records are necessary for nonsurgical admissions as well as for the surgical admission.

Where a history or clinical diagnosis of significant coronary heart disease is confirmed that requires a denial, the FAA will send a formal denial letter and information concerning rights of appeal (FAA Form 8500-4.1). If the airman wishes to petition for an exemption, a current cardiovascular evaluation by an internist or cardiologist is requested. The protocol for this examination is provided by the FAA. It includes a requirement for electrocardiographic exercise stress testing. If coronary artery bypass surgery is involved, postoperative coronary angiography at least 1 year following surgery is normally required for favorable consideration.

For a history of a myocardial infarction, medical records must contain documentation of an asymptomatic period of at least 2 years following the infarction. Documentation must include all pertinent records and a report of a complete current cardiovascular evaluation, including stress electrocardiography, conducted in accordance with FAA instructions. Post-infarct angiography may be required in some cases and, in all cases, the 2-year waiting period for FAA consideration may be shortened to 1 year if post-infarction angiography is available at that time. Certification of persons who have had infarctions or coronary artery bypass surgery is principally limited to private flying. Limited commercial duties may, however, be permitted by the FAA. Persons certified will be required to provide followup cardiovascular evaluations, to include stress electrocardiography at 6-month intervals. Repeat angiography is required only if there appears to be an adverse change in the airman's condition.

Most grants of exemption specify that subsequent issuances of certificates will be by the Aeromedical Certification Branch, AAC-130. The Examiner should never issue, even when convinced that there has been no adverse change, unless specially authorized to do so by the Grant of Exemption document. If the applicant insists upon expediting the renewal of his/her certificate under the grant of exemption, the Examiner may call the Aeromedical Certification Branch, AAC-130, for instructions.

If a grant of exemption is terminated because of adverse change, the applicant may re-petition for an exemption. The required evaluation and documentation are essentially the same. Medical records previously submitted need not be resubmitted.

F. Heart Murmur

When in the course of conducting a routine FAA examination the Examiner discovers a heart murmur, a statement should be made indicating whether the Examiner believes it to be functional or organic and if a special examination is needed. If the latter is indicated, the Examiner should defer issuance of the medical certificate and forward the completed FAA Form 8500-8 to the FAA for further consideration.

G. Surgery

The presence of an aneurysm of a major vessel of the body is disqualifying for medical certification of any class. Following successful surgical intervention and correction, the applicant may ask for consideration by the FAA. The Examiner should be aware of several criteria used by the Aeromedical Certification Branch, AAC-130, to determine eligibility of these individuals. Of importance is the time interval since surgery. It is recommended that the applicant wait for at least 6 months following the surgery before making reapplication for certification. The likelihood of certification is enhanced in those situations where all medications have been discontinued and a current evaluation reveals no evidence of cardiovascular or renal disease.

A history of coronary artery bypass surgery is disqualifying for certification by the Examiner. Such surgery does not negate a past history of coronary heart disease. For details, see paragraph E of this section.

The presence of cardiac pacemakers and artificial heart valves is disqualifying. Heart valves made of tissue seem to have a better prognosis than mechanical devices, especially in reference to those factors key to aviation safety. Applicants seeking further consideration by the FAA should be prepared to submit all past records and a report of a complete current cardiovascular evaluation in accordance with specifications provided by the FAA.

H. Vascular Disease

Arteriosclerotic vascular disease when mild, presents no impediment to medical certification. At some point in the natural course of this disease process, the nature and severity of related symptoms will preclude continued certification. This is certainly true by the time surgical intervention is contemplated. Following surgery (such as an endarterectomy) it is possible that favorable consideration will be given by the FAA unless disease that was not amenable to surgery remains.

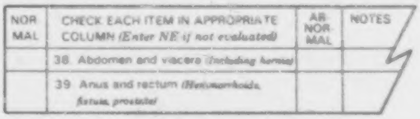
Vascular occlusions (such as in the carotid artery) present an impediment to certification much like that of arteriosclerosis involving the extremities and aorta. However, in addition to recovery from surgery and demonstrating that the disease is not severe, these individuals must also show that there are no neurological deficits or signs of other cardiovascular disease, especially of the coronary arteries.

The applicant who has a history of pulmonary embolus without sequelae or need for medication may be certified. Often such individuals are placed upon prophylactic or maintenance anticoagulant therapy such as Coumadin. The use of anticoagulant medication precludes certification. These applicants should be denied by the Examiner. Other diseases such as coronary artery disease and thrombophlebitis or phlebothrombosis carry a poor prognosis for issuance of even a limited medical certificate of any class. When medical management of the disease results in a clinical status wherein medication is no longer a requirement, prospects for a favorable certification decision by the FAA are much improved.

IV. REFERENCES

A major reference source for detailed considerations of hypertensive and other cardiovascular conditions as related to aviation safety is "Cardiovascular Problems Associated with Aviation Safety," Eighth Bethesda Conference of the American College of Cardiology, The American Journal of Cardiology, October 31, 1975.

ITEMS 38-39. Gastro-Intestinal



NORMAL	CHECK EACH ITEM IN APPROPRIATE COLUMN *(Enter NE if not evaluated)*	ABNORMAL	NOTES
	38. Abdomen and viscera *(Including hernia)*		
	39. Anus and rectum *(Hemorrhoids, fistula, prostate)*		

I. FEDERAL AVIATION REGULATIONS

A. All Classes: FAR 67.13, .15, and .17 (f)(2):

***No other organic functional, or structural disease, defect, or limitation that the Federal Air Surgeon finds --

Makes the applicant unable to safely perform the duties or exercise the privileges of the airman certificate that he holds or for which he is applying; or

May reasonably be expected, within 2 years after the finding to make him unable to perform those duties or exercise those privileges;

and the findings are based on the case history and appropriate, qualified, medical judgment relating to the condition involved.

II. EXAMINATION PROCEDURES

A. Equipment

The only equipment needed for the conduct of the examination applicable to these items is that necessary for rectal examination - gloves or finger cots, lubricant, and wipes. However, medical history and/or physical findings may indicate a need for special tests (e.g., X-ray, laboratory facilities).

B. Examination Techniques

In order to help reduce the likelihood of omissions and to conserve time, it is recommended that the Examiner follow a set protocol. The Examiner must review the applicant's history prior to conducting the medical examination.

1. Observation - The Examiner should note any unusual shape or contour, skin color, moisture, temperature, and presence of scars. Hernias, hemorrhoids, and fissure should be noted and recorded.

2. Palpation - Examine for and note enlargement of organs, unexplained masses, tenderness, guarding, and rigidity.

3. Digital Examination - During the digital examination note the following:

a. sphincter tone
b. internal hemorrhoids
c. prostatic size and contour, consistency, tenderness
d. evidence of infection
e. unexplained masses
f. color of feces

III. DISPOSITION

The following enumerates some gastrointestional pathology that is disqualifying. This list is not comprehensive and other disorders may also be disqualifying. Applicants found not qualified for issuance of a medical certificate may request further consideration by the FAA.

A. Item 38 - Abdomen and Viscera

1. Cholelithiasis

2. Cirrhosis

3. Hepatitis, acute; or chronic with impaired liver function.

4. Ventral or hiatal hernia, if symptomatic; or any hernia likely to incarcerate or strangulate.

5. Splenomegaly

6. Malignancy

7. Peptic ulcer (see below)

a. Active within 3 months preceding the date of examination.

b. Bleeding (within 6 months preceding the date of examination).

B. Item 39 - Anus and Rectum

Rectal or prostatic malignancy.

C. Special Procedure for Ulcer

An applicant with a history of an active ulcer within the past 3 months or a bleeding ulcer within the past 6 months must provide evidence that the ulcer is healed to be further considered for medical certification. Evidence of healing constitutes a report from the attending physician that includes the following information:

1. Confirmation that the applicant has been free of symptoms.

2. Radiographic evidence that the ulcer is healed.

3. Type, dosage, and frequency of medication used.

This information should be submitted with the application, FAA Form 8500-8, with all certificate copies attached, to the Aeromedical Certification Branch, AAC-130. Under favorable circumstances the FAA may issue a certificate with special restrictions. For example, an applicant with a history of bleeding ulcer may be required to have his/her physician submit followup reports every 6 months for 1 year following initial certification.

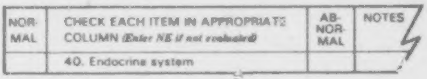
The use of any medication other than simple antacids will preclude certificate issuance. Applicants with a history of gastric resection for ulcer may be favorably considered if free of sequelae.

D. Special Consideration for Regional Enteritis

The episodic occurrence of symptoms and the medications used for treatment of regional enteritis makes certification unlikely. Six months after surgery, however, the individual's eligibility for medical certification could be established upon written evidence from his/her surgeon that recovery is complete.

Applicants with colectomy and/or ileostomy may also receive consideration from the FAA. A report is necessary to confirm that the applicant has fully recovered from the surgery, and is completely asymptomatic.

ITEM 40. ENDOCRINE



NORMAL	CHECK EACH ITEM IN APPROPRIATE COLUMN (Enter NE if not evaluated)	ABNORMAL	NOTES
	40. Endocrine system		

I. FEDERAL AVIATION REGULATIONS

A. All Classes: FAR 67.13, .15, and .17 (f)(1) and (f)(2):

***No established medical history or clinical diagnosis of diabetes mellitus that requires insulin or any other hypoglycemic drug for control.

***No other organic, functional, or structural disease, defect, or limitation that the Federal Air Surgeon finds --

Makes the applicant unable to safely perform the duties or exercise the privileges of the airman certificate that he holds or for which he is applying; or

May reasonably be expected, within 2 years after the finding, to make him unable to perform those duties or exercise those privileges;

and the findings are based on the case history and appropriate, qualified, medical judgment relating to the condition involved.

II. EXAMINATION PROCEDURES

A. Equipment

No equipment is required. The physicians' skills of history taking, observation, palpation, etc., are the principal tools in detecting abnormalities of the endocrine system.

B. Technique

A protocol for examinations applicable to Item 40 is not provided since the necessary history taking, observation, and other examination techniques used in examining other systems have already revealed much of what can be known about the status of the applicant's endocrine system. For example, the examination of the skin alone can reveal important signs of thyroid dysfunction, Addison's disease, Cushing's disease, and several other endocrine disorders. The eye may reflect a thyroid disorder (exophthalmos), or diabetes (retinopathy).

When the Examiner reaches Item 40 in the course of his/her examination of an applicant, however, it is recommended that a moment be taken to review and determine if key procedures have been performed in conjunction with examinations made under other items:

1. Has the neck been palpated and the hair, skin, and fingernails checked for signs of thyroid disease?

2. Have the eyes been checked for diabetic retinopathy? Are there neural or vascular changes suggestive of diabetes?

3. Is there acromegaly or other growth abnormalities suggesting a pituitary dysfunction?

4. Is there abnormal calcium deposition or bony abnormalities to suggest parathyroid disease?

5. Has the abdomen been checked for the striae of Cushing's disease and have the hands been observed for the abnormal pigmentation of Addison's disease?

6. Is there evidence of fluid imbalance? Are the sexual characteristics within normal range?

III. DISPOSITION

The following list enumerates some of the endocrine pathologies which disqualify an applicant. The list is not comprehensive and other disorders may also be cause for denial or deferral. Applicants not issued a medical certificate may request further consideration by the FAA.

A. Endocrine Disorders/Other Than Diabetes Mellitus

1. Acromegaly

2. Addison's disease or syndrome.

3. Cushing's disease or syndrome.

4. Diabetes insipidus (see below).

5. Hypoglycemia, whether functional or a result of pancreatic tumor. A history of hypoglycemia may not, in itself, be disqualifying. Further evaluation is necessary to confirm the diagnosis, underlying cause and clinical significance.

6. Hyperthyroidism

7. Hypothyroidism if symptomatic.

8. Hyperparathyroidism

9. Hypoparathyroidism

B. Special Consideration for Diabetes

A blood glucose determination is not a routine part of the FAA medical evaluation for any class of medical certificate. However, the examination does include a routine urinalysis (see Item 58).

A medical history or clinical diagnosis of diabetes mellitus may be considered as previously established when the diagnosis has been or clearly could be made because of supporting laboratory findings and/or clinical signs and symptoms.

When an applicant with a history of diabetes is examined for the first time, the Examiner should explain the procedures involved and assist in obtaining prior records and current special testing (see FAA Form 8500-17, Appendix 2). Past and present clinical data (history, physical and laboratory findings) must be obtained to document the appropriate diagnosis, status of the disease process, adequacy of control and need for medication. Prior clinical information need not be updated if no more than 90-days old at the time of the FAA examination.

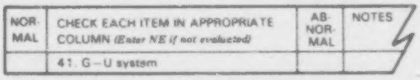
The current use or recent use of medications for control of an abnormality of carbohydrate metabolism mandates a denial under the (f)(1) paragraphs of Part 67 of the Federal Aviation Regulations.

When hypoglycemic medication is required, the Examiner should inform the applicant that medical certification by the FAA is not possible either under the medical standards or the exemption process. Exemptions have not been granted to persons with diabetes mellitus who require hypoglycemic medication.

The American Diabetes Association, on several occasions, has expressed the opinion that personnel whose job performance is intimately concerned with the safe operation of aircraft should not be individuals with diabetes requiring insulin or oral hypoglycemics for control.

A history of diabetes that no longer requires medication for control is not, in itself, disqualifying. If the applicant's physician recommends control by diet alone, a trial period of at least 90 days without the use or need for insulin or other hypoglycemic agent is required. If after that time the physician recommends continuance of control by diet and other regimens not involving drugs, the applicant may request further consideration by the FAA. If, on special evaluation, he/she is found qualified, the FAA will issue a time-limited certificate and require followup reports (often at 6-month intervals) in order to verify that the diabetes remains under good control and no significant cardiovascular, renal, or other complications exist. An annual cardiovascular evaluation may be required. Followup reports are expected to reflect that the applicant has been seen by his/her treating physician on a regular basis. See FAA Form 8500-18.

ITEM 41. G-U SYSTEM



NORMAL	CHECK EACH ITEM IN APPROPRIATE COLUMN *(Enter NE if not evaluated)*	ABNORMAL	NOTES
	41. G–U system		

I. FEDERAL AVIATION REGULATIONS

A. All Classes: FAR 67.13, .15, .17 (f)(2)

***No other organic, functional, or structural disease, defect, or limitation that the Federal Air Surgeon finds --

Makes the applicant unable to safely perform the duties or exercise the privileges of the airman certificate that he holds or for which he is applying; or

May reasonably be expected, within 2 years after the finding to make him unable to perform those duties or exercise those privileges;

and the findings are based on the case history and appropriate, qualified, medical judgment relating to the condition involved.

II. EXAMINATION PROCEDURES

A. Equipment

No special equipment is needed for routine examination.

B. Examination Techniques

The Examiner should observe for discharge, inflammation, skin lesions, scars, strictures, tumors, and secondary sexual characteristics. Palpation for masses and areas of tenderness should be carried out.

No vaginal examination is routinely required. Sexual disorders such as sterility and menstrual irregularity are not usually of importance in qualification for medical certification.

Specialty evaluations may be indicated by history or by physical findings on the routine examination. A personal history of urinary symptoms is important:

1. Pain or burning upon urination.
2. Dribbling or incontinence.
3. Polyuria, frequency, or nocturia.
4. Hematuria, pyuria, or glycosuria.

Special procedures for evaluation of the G-U system should best be left to the discretion of a urologist, nephrologist or gynecologist, with the permission of the applicant.

III. DISPOSITION

The following conditions are disqualifying for issuance of a medical certificate by the Examiner. Further consideration by the FAA may be obtained by written request. The following list is not all-inclusive and other G/U findings may also be disqualifying. See Item 40 for details concerning diabetes and Item 58 for other information related to the examination of the urine.

A. Urinary System

1. Calculus: renal, ureteral, or vesical (see H below).

2. Hydronephrosis with impaired renal function.

3. Nephrectomy, if associated with hypertension, uremia, infection of the remaining kidney, or other evidence of reduced renal function in the remaining kidney.

4. Nephritis: acute or chronic.

5. Nephrocalcinosis.

6. Nephrosis.

7. Polycystic kidney disease.

8. Pyelitis or pyelonephritis.

9. Pyonephrosis.

10. Tumors or malignancies.

11. Renal stones are disqualifying for issuance of a medical certificate by the Examiner. The Examiner should either deny or defer issuance and forward the completed report (FAA Form 8500-8) to the Aeromedical Certification Branch in Oklahoma City. Complete studies to determine the possible etiology and prognosis are essential to favorable consideration. Determining factors include size and location of the stones, complications such as compromise in renal function, repeated bouts of kidney infection, and need for therapy. Any underlying disease would be considered. Of primary concern is the likelihood of sudden incapacitating symptoms.

12. Congenital lesions of the kidney are often benign and certification of applicants with ectopic and horseshoe kidney, agenesis (unilateral) and even hypoplasia and dysplasia is possible.

13. Cystostomy and neurogenic bladder require evaluation by a specialist and deferral of certification to the Aeromedical Certification Branch in Oklahoma City.

14. Glycosuria requires special evaluation. See also Item 40 for glycosuria associated with diabetes.

15. Renal transplant is cause for denial by the Examiner. Certification by the FAA may be possible after complete recovery.

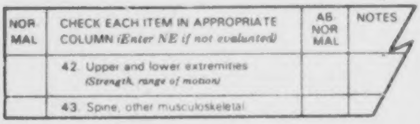
B. Genital/Reproductive System

1. Use of oral contraceptives is not disqualifying for medical certification. If the applicant is experiencing no adverse symptoms or reactions to cyclic hormones and is otherwise qualified, the Examiner may issue the desired certificate.

2. Pregnancy under normal circumstances does not disqualify. It is recommended that the applicant's obstetrician be made aware of all aviation activities so that he/she can impose any restrictions. The Examiner

may wish to counsel applicants concerning piloting aircraft during the third trimester, and the proper use of lap belt and shoulder harness may warrant discussion.

ITEMS 42-43. MUSCULOSKELETAL



NORMAL	CHECK EACH ITEM IN APPROPRIATE COLUMN *(Enter NE if not evaluated)*	ABNORMAL	NOTES
	42. Upper and lower extremities *(Strength, range of motion)*		
	43. Spine, other musculoskeletal		

I. FEDERAL AVIATION REGULATIONS

A. All Classes: FAR 67.13, .15, and .17 (f)(2).

***No other organic, functional, or structural disease, defect, or limitation that the Federal Air Surgeon finds --

Makes the applicant unable to safely perform the duties or exercise the privileges of the airman certificate that he holds or for which he is applying; or

May reasonably be expected, within 2 years after the finding, to make him unable to perform those duties or exercise those privileges;

and the findings are based on the case history and appropriate, qualified, medical judgment relating to the condition involved.

II. EXAMINATION PROCEDURES

A. Equipment

No special equipment is required.

B. Examination Techniques

Standard examination procedures should be used to make a gross evaluation of the integrity of the applicant's musculoskeletal system. The Examiner should note:

1. Pain - neuralgia, myalgia, paresthesias, related circulatory and neurological findings.

2. Weakness - local or generalized, degree and amount of functional loss.

3. Paralysis - atrophy, contractures, and related dysfunctions.

4. Motion - coordination, tremors, loss or restriction of joint motions, and performance degradation.

5. Deformity - extent and cause.

6. Amputation - level, stump, healing, and phantom pain.

7. Prosthetics - comfort and ability to use effectively.

See Item 46 for the neurological evaluation of motor functions.

III. DISPOSITION

The following conditions are disqualifying for issuance of a medical certificate by the Examiner. Further consideration by the FAA may be obtained through written request. This list is not all inclusive and other bone/muscle/joint conditions may also be disqualifying.

A. Item 42 - Upper and Lower Extremities.

1. Amputation of any extremity or any portion thereof sufficient to interfere with performance of airman duties.

2. Atrophy of muscles of any part which is progressive or is sufficient to interfere with the performance of airman duties.

3. Deformities, either congenital or acquired, if sufficient to interfere with the performance of airman duties.

4. Limitation of motion of a major joint, if sufficient to interfere with the performance of airman duties.

5. Neuralgia, chronic or acute, particularly sciatica, if it results in interference with function or is likely to become incapacitating.

6. Osteomyelitis, acute or chronic, with or without draining fistula(e).

7. Tremors, if of sufficient degree to interfere with the performance of airman duties.

B. Item 43 - Spine, Other Musculoskeletal

1. Active disease of bones and joints, including arthritis.

2. Curvature, ankylosis, or other marked deformity of the spinal column sufficient to interfere with the performance of airman duties.

3. Herniation of intervertebral disc.

4. Other disturbances of musculoskeletal function, congenital or acquired, sufficient to interfere with the performance of airman duties or likely to progress to that degree, such as:

a. Musculoskeletal effects of cerebral palsy.
b. Myasthenia gravis.
c. Muscular dystrophy or other myopathies.

5. Amputations, with or without prosthesis, are considered to be static defects and best evaluated by means of a special medical flight test. The Examiner should defer issuance. If otherwise qualified, the Examiner will issue a certificate bearing the limitation "Valid for Student Pilot Purposes Only." This certificate will permit the applicant to proceed with flight training until he/she is ready for a private pilot flight test. At that time, at the applicant's request, the FAA (usually the Aeromedical Certification Branch, AAC-130) will authorize the student pilot to take a medical flight test in conjunction with the regular flight test. The medical flight test and regular private pilot flight test are conducted by an FAA inspector. This affords the student an opportunity to demonstrate ability to control the aircraft despite the handicap. The FAA inspector prepares a written report and indicates whether there is a safety problem. A medical certificate and Statement of Demonstrated Ability, without the student limitation, may be provided to the inspector for issuance to the applicant or the inspector may be required to send the report to the FAA medical officer who authorized the test.

When prostheses are used or additional control devices installed in an aircraft to assist the amputee, those found qualified by special certification procedures may have their certificates limited to require that the devices (and even the specific aircraft) must always be used when exercising the privileges of the airman certificate.

6. Arthritis, when symptomatic or requiring medication, is disqualifying unless the applicant holds

a letter from the FAA specifically authorizing the Examiner to issue the certificate when the applicant is found otherwise qualified.

Although the use of many medications on a continuing basis ordinarily contraindicates the performance of pilot duties, under certain circumstances, certification is possible for an applicant who is taking aspirin, ibuprofen (Motrin), naproxen (Naprosyn), or other similar agents. Further consideration for medical certification is made by the FAA (not the Examiner) if the applicant presents evidence documenting that the underlying condition for which the medicine is being taken is not in itself disqualifying, and that the applicant has been on therapy long enough to have established tolerance or absence of adverse side effects.

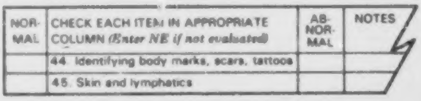
The Examiner should advise an applicant who plans to request further consideration that, if certified by the FAA, limitations may be placed un the medical certificate and followup evaluations may be required.

7. A history of intervertebral disc surgery is not disqualifying. If the applicant is asymptomatic, has completely recovered from surgery, is taking no medication, and there is no neurological deficit, the Examiner should confirm these facts by a brief statement under Item 61 of the FAA Form 8500-8 or by a letter attached to the application. The Examiner is then authorized to issue any class of medical certificate, assuming the individual meets all the medical standards for that class.

8. The paraplegic, when paralysis is not due to a progressive disease process, is considered in much the same manner as an amputee. The Examiner should defer issuance and advise the applicant that he/she may request further consideration from the FAA. The applicant is authorized to take a medical flight test along with the check-ride. If successful, the limitation "Valid for Student Pilot Purposes Only" is removed from the medical certificate but operational limitations may be added. A Statement of Demonstrated Ability is issued.

9. Other neuromuscular conditions are covered in more detail under Item 46 (eurologic).

ITEMS 44-45. SKIN/LYMPHATICS



NORMAL	CHECK EACH ITEM IN APPROPRIATE COLUMN *(Enter NE if not evaluated)*	ABNORMAL	NOTES
	44. Identifying body marks, scars, tattoos		
	45. Skin and lymphatics		

I. FEDERAL AVIATION REGULATIONS

A. All Classes: FAR 67.13, .15, and .17 (f)(2).

***No other organic, functional, or structural disease, defect, or limitation that the Federal Air Surgeon finds --

Makes the applicant unable to safely perform the duties or exercise the privileges of the airman certificate that he holds or for which he is applying; or

May reasonably be expected, within 2 years after the finding, to make him unable to perform those duties or exercise those privileges;

and the findings are based on the case history and appropriate, qualified, medical judgment relating to the condition involved.

II. EXAMINATION PROCEDURES

A. Equipment

None required.

B. Examination Techniques

A careful examination of the skin and lymphatics may reveal underlying systemic disorders of clinical importance. Needle marks that suggest drug abuse should be noted and body marks and scars should be correlated with known history. Further history should be obtained as needed to explain findings. Tattoos should be recorded since they may be useful for identification purposes in case of accident.

III. DISPOSITION

The following is a partial list of conditions that warrant denial or deferral to the Aeromedical Certification Branch, AAC-130:

A. Item 44 - Identifying Body Marks, Scars, and Tattoos

Scars and Tattoos

Scar or scar tissue which involves the loss of function sufficient to interfere with the safe performance of airman duties.

B. Item 45 - Skin, Lymphatics

1. Adenopathy secondary to systemic disease or metastasis.

2. Hodgkin's disease, lymphoma, lymphosarcoma.

3. Malignant melanoma or, if surgically removed, evidence of metastasis.

4. Neurofibromatosis with central nervous system involvement.

5. Lymphedema

ITEM 46. NEUROLOGIC

NORMAL	CHECK EACH ITEM IN APPROPRIATE COLUMN *(Enter NE if not evaluated)*	ABNORMAL	NOTES
	46 Neurologic *(Tendon reflexes, equilibrium, senses, coordination, etc.)*		

I. FEDERAL AVIATION REGULATIONS

A. All Classes: FAR 67.13, .15, and .17 (d)(2) Neurologic:

***No established medical history or clinical diagnosis of either of the following:

a. Epilepsy

b. A disturbance of consciousness without satisfactory medical explanation of the cause.

***No other convulsive disorder, disturbance of consciousness, or neurologic condition that the Federal Air Surgeon finds --

Makes the applicant unable to safely perform the duties or exercise the privileges of the airman certificate that he holds or for which he is applying; or

May reasonably be expected, within 2 years after the finding, to make him unable to perform those duties or exercise those privileges;

and the findings are based on the case history and appropriate, qualified, medical judgment relating to the condition involved.

II. EXAMINATION PROCEDURES

A. History

A neurologic evaluation should consist of a thorough review of the applicant's history prior to the neurological examination. In addition to those items of the medical history contained in Item 21, specific inquiry concerning a history of weakness or paralysis, disturbance of sensation, loss of coordination, or loss of bowel or bladder control should be made. Also a previous history of certain laboratory procedures such as X-rays of the head or spine, electroencephalograms, or spinal taps may elicit a remote problem in the applicant's medical history. Conditions identified should be noted under "Remarks" with facts such as dates, frequency and severity of occurrence.

B. Examination Techniques

The basic neurological examination consists of an examination of the 12 cranial nerves, motor strength, superficial reflexes, deep tendon reflexes, sensation, coordination, and mental status. The Examiner should be aware of any asymmetry in responses between the two sides of the body since mild or early abnormalities may be elicited in this way. Particular emphasis also may be given to the gross visual field by direct confrontation (Item 54), the Babinski reflex, the Romberg sign, and the abdominal reflexes. These tests involve long and multiple pathways within the brain and/or spinal cord.

III. DISPOSITION

A. An established history of either of the following conditions is disqualifying for medical certification:

1. Epilepsy

2. A disturbance of consciousness without satisfactory explanation of the cause.

The only meaningful appeal for an applicant with such a history is to petition for a grant of exemption from the medical standards of the Federal Aviation Regulations. A petition for exemption is reviewed by FAA medical consultants, and a recommendation concerning an applicant's eligibility for medical certification is made to the Federal Air Surgeon. Infrequently, exemptions have been granted when a history of a seizure disorder has occurred in childhood and the individual has been seizure-free for a prolonged interval of years. Factors which would be considered in determining eligibility in such cases would be age at onset, nature and frequency of seizures, precipitating causes, and duration of stability without medication. Followup evaluations are usually necessary to affirm continued stability of an individual's condition if an exemption is granted.

B. A history or presence of any neurological condition or disease which potentially may incapacitate an individual should be regarded as initially disqualifying. Issuance of a medical certificate to an applicant in such cases should be denied or deferred pending further evaluation. Also, a waiting period following illness or injury may be advisable to permit adequate stabilization of an individual's condition and to reduce the risk of an adverse event. Applications by individuals with potentially disqualifying conditions should be forwarded to the FAA. Processing such applications can be expedited by including hospital records, consultation reports, and appropriate laboratory studies if available. Symptoms or disturbances secondary to the underlying condition which may be acutely incapacitating include pain, weakness, vertigo or incoordination, seizures or a disturbance of consciousness, visual disturbance, or mental confusion. Chronic conditions may be incompatible with safety in aircraft operation due to long-term unpredictability, severe neurologic deficit, or psychological impairment.

A history or presence of any of the following conditions should preclude issuance of a medical certificate by the Examiner:

1. Head trauma associated with:

a. Unconsciousness or disorientation of more than 1 hour following injury.
b. Focal neurologic deficit.
c. Skull fracture.
d. Post-traumatic headache.
e. Subdural or epidural hematoma.

Complete neurological evaluation with appropriate laboratory studies will be required to determine an applicant's eligibility. A period of stabilization of no less than 6 months will usually be required to confirm adequate recovery from any of the above conditions prior to consideration for medical certification.

2. Headache

a. Migraine
b. Migraine equivalent
c. Cluster headache
d. Chronic tension headache
e. Conversion headache
f. Trigeminal Neuralgia
g. Atypical facial pain

Pain, in some conditions, may be acutely incapacitating. Chronic recurring headaches or pain syndromes often require medications for relief or prophylaxis, and, in most instances, use of such medications is disqualifying due to their interference with a pilot's alertness and reflex functioning.

3. Vertigo or disequilibrium

a. Benign positional vertigo
b. Meniere's disease and acute peripheral vestibulopathy
c. Alternobaric vertigo
d. Hyperventilation syndrome
e. Orthostatic hypotension
f. Nonfunctioning labyrinths
g. Vascular or neoplastic brain stem or temporal lobe involvement

Numerous conditions may affect equilibrium resulting in acute incapacitation or varying degrees of chronic recurring spatial disorientation of a pilot. Use of medications prophylactically also may affect pilot performance. In most instances, further neurological evaluation will be required to determine eligibility for medical certification; therefore, issuance of a medical certificate should be deferred.

4. Cerebrovascular disease

a. Transient ischemic attack (TIA).
b. Cerebral infarction, thrombotic or embolic.
c. Transient global amnesia (TGA).
d. Intracerebral or subarachnoid hemorrhage.
e. Intracranial aneurysm or arteriovenous malformation.

Complete neurological evaluations supplemented with appropriate laboratory studies are required of applicants with the above conditions. Complete cerebral arteriography is necessary for review in cases of subarachnoid hemorrhage.

5. Intracranial tumor

a. A variety of intracranial tumors, both malignant and benign, are capable of causing incapacitation of an individual directly by neurologic deficit or indirectly through recurrent symptomatology. Potential neurologic deficits include weakness, loss of sensation, ataxia, visual deficit, or mental impairment. Recurrent symptomatology may interfere with flight performance through mechanisms such as seizure, headaches, vertigo, visual disturbances, or confusion. A history or diagnosis of an intracranial tumor necessitates a complete neurological evaluation with appropriate laboratory studies before determination of eligibility for medical certification can be established. Individuals with a history of certain benign supratentorial tumors may be considered favorably for medical certification by the FAA and returned to flying status after a minimum satisfactory convalescence of 1 year.

b. Pseudotumor cerebri (benign intracranial hypertension). Although the ulitmate prognosis of this idiopathic condition usually is good, issuance of a medical certificate should be deferred and medical records forwarded to the Aeromedical Certification Branch, AAC-130, for evaluation.

6. Hydrocephalus and shunts

a. Hydrocephalus secondary to a known injury or disease process.

b. Normal pressure hydrocephalus.

Individuals with a history or diagnosis of hydrocephalus or a corrective shunt should be deferred issuance of a medical certificate pending further neurologic evaluation.

7. Spasticity, weakness, or paralysis of the extremities.

Conditions which are stable and nonprogressive may be considered for medical certification. Information necessary for determining eligiblity for medical certification include the medical history, etiology of the neurological condition, degree of involvement, period of stability, hospital records, and total current health and neurological status of the individual. Neurological consultation will be required including appropriate laboratory studies. Issuance of a medical certificate should be deferred by the Examiner, and all records referred to the Aeromedical Certification Branch, AAC-130.

8. Demyelinating and autoimmune disease.

a. Multiple sclerosis.
b. Acute optic neuritis.
c. Myasthenia gravis.
d. Landry-Guillain-Barre syndrome.
e. Allergic encephalomyelitis.
f. Collagen disease.

(1) Lupus erythematosus.
(2) Periarteritis nodosa.
(3) Acute polymyositis.
(4) Dermatomyositis

Due to the variablity and unpredictability of involvement and course of the above conditions, each applicant's case must be considered individually by the FAA to determine eligiblity for medical certification. Factors used in determining eligibility will include the medical history, neurological involvement and persisting deficit, period of stability without symptoms, type and dosage of medications used, and general health. A neurological and/or medical consultation will be necessary in most instances. Issuance of a medical certificate should be deferred and all medical records sent to the Aeromedical Certification Branch, AAC-130.

9. Extrapyramidal, hereditary, and degenerative diseases of the nervous system.

a. Parkinson's disease.
b. Essential tremor.
c. Huntington's disease.
d. Wilson's disease.
e. Dystonia musculorum deformans.
f. Gilles de la Tourette syndrome.
g. Athetosis.
h. Creutzfeldt-Jakob disease.
i. Presenile and senile dementia.

Considerable variability exists in the severity of involvement, rate of progression, and treatment of the above conditions. A complete neurological evaluation with appropriate laboratory studies including information specifically on the above factors will be necessary for determination of eligiblity for medical certification. Conditions which have a poor prognosis will likely be denied. The applicant should not be encouraged to pursue medical certification.

10. Infections of the nervous system.

a. Meningitis
b. Brain abscess
c. Acute viral encephalitis
d. Neurosyphilis

Many different types of infection of the nervous system exist, and post-infectious complications and degree of recovery may differ widely. The most significant factors to be considered include the possibility of a seizure disorder or mental impairment. A complete neurological evaluation with appropriate laboratory studies will be required to determine eligiblity for medical certification. Issuance of a medical certificate should be deferred and all medical records forwarded to the Aeromedical Certification Branch, AAC-130.

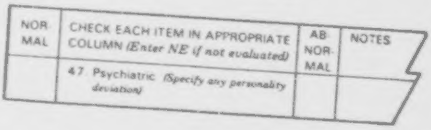
11. Other neurological conditions.

Many other neurological conditions exist which may be disqualifying for airman medical certification. The above-listed conditions represent only some of the major disqualifying problems.

IV. REFERENCES

A major reference source for detailed considerations of neurological and neurosurgical conditions as related to aviation safety is "Neurological and Neurosurgical Conditions Associated With Aviation Safety," Archives of Neurology, November 16, 1979, Volume 36, Number 12.

ITEM 47. PSYCHIATRIC



NORMAL	CHECK EACH ITEM IN APPROPRIATE COLUMN (*Enter NE if not evaluated*)	ABNORMAL	NOTES
	47. Psychiatric (*Specify any personality deviation*)		

I. FEDERAL AVIATION REGULATIONS

A. All Classes: FAR 67.13, .15, and .17 (d)(1) Mental:

***No established medical history or clinical diagnosis of any of the following:

A personality disorder that is severe enough to have repeatedly manifested itself by overt acts.

A psychosis.

Alcoholism. As used in this section, "alcoholism" means a condition in which a person's intake of alcohol is great enough to damage his physical health or personal or social functioning, or when alcohol has become a prerequisite to his normal functioning.

Drug dependence. As used in this section, "drug dependence" means a condition in which a person is addicted to, or dependent on, drugs other than alcohol, tobacco, or ordinary caffeine-containing beverages, as evidenced by habitual use or a clear sense of need for the drug.

***No other personality disorder, neurosis, or mental condition that the Federal Air Surgeon finds --

Makes the applicant unable to safely perform the duties or exercise the privileges of the airman certificate that he holds or for which he is applying; or

May reasonably be expected, within 2 years after the finding, to make him unable to perform those duties or exercise those privileges;

and the findings are based on the case history and appropriate, qualified, medical judgment relating to the condition involved.

II. EXAMINATION PROCEDURES

A. Equipment

No psychological tests or other special software or hardware is routinely required for the psychiatric evaluation in completing FAA Form 8500-8.

B. Examination Techniques

The FAA does not expect the Examiner to perform a psychiatric interview. However, the Examiner should form a general impression of the emotional stability or mental state of the applicant.

Evaluation of the applicant's history as provided on the application form may alert the Examiner to gather further important factual information. A great deal of information about the individual may be found in items related to age, pilot time, and class of certificate applied for. Information about the length of present occupation and employer also may be important. If any psychotropic drugs are being used, followup questions are appropriate. Previous medical denials or aircraft accidents may be related to psychiatric problems.

Psychiatric information can be derived from the individual items in medical history (Item 21). Any affirmative answers to nervous trouble of any sort or an attempted suicide are significant. Any admission of alcohol or drug problems deserves followup. A record of traffic violations may reflect certain personality problems or indicate an alcohol problem. Affirmative answers related to rejection from military service or medical discharge requires elaboration. Often applicants are incorrect as to their previous diagnoses, either because they don't know or because they choose to minimize past difficulties. If there was an admission to hospital for any emotionally-related problem, it will be necessary to obtain the entire record. Reporting symptoms like headaches or dizziness or even heart or stomach trouble may reflect a history of anxiety rather than a primary medical problem in these areas.

Additional information can be derived from the casual conversation that occurs during the physical examination. Some of this conversation will reveal information about the family, the job, and special interests. Even some personal troubles may be revealed at this time. The Examiner's questions should not be stilted or follow a regular pattern. These should be a natural extension of the Examiner's curiosity about the person being examined. Information about the motivation for medical certification and interest in flying may be revealing. A formal Mental Status Examination is unnecessary. For example, it is not necessary to ask about time, place, or person to discover whether the examinee is oriented. The information about the flow of associations, mood, and memory, are generally available from the usual interactions during the examination.

Elements of observations during this part of the medical examination should be recorded in Item 61 of the application form. If there are any significant problems identified, the Examiner should defer issuance of the medical certificate and report the suspicions to the FAA. This could be accomplished by contacting the Regional Flight Surgeon or the Aeromedical Certification Branch, AAC-130.

III. DISPOSITION

A. General Considerations

It must be pointed out that considerations for safety, which in the "mental" area are related to a compromise of judgment and emotional control or to diminished mental capacity with loss of behavioral control, are not the same as concerns for emotional health in everyday life. There are some considerations that may have only slight impact on the overall capacities of an individual and the quality of his/her life, but nevertheless have great impact on safety. Conversely, there are many emotional problems that are of therapeutic and clinical concern, but have no impact on safety.

The fact that an applicant has seen a mental health professional needs to be followed up, but may be found not to have significance for medical certification. For instance, growth and adjustment problems requiring psychotherapy are usually not considered significant for safety when there are no vocational disruptions and medications are not used. This might include marital counseling, or psychotherapy for identity problems or issues of growth and personal fulfillment. A history of brief situational problems secondary to such life events as marital disruption, business problems, and the death of loved ones may likewise not be significant. Also, sexual behavior that does not reflect upon overall judgment and self control are not concerns for safety.

B. Mandatory Denials

The FAA has concluded that certain psychiatric conditions are such that their presence or a past history of their presence is sufficient to suggest a potential threat to safety. It is, therefore, incumbent upon the Examiner to be aware of any indications of these conditions currently, or in the past, and to deny or defer issuance of the medical certificate to an individual who has a history of these conditions. Persons who have a current diagnosis or history of these conditions may petition the FAA for an exemption and, based upon individual considerations, exemptions may be granted.

1. The category of personality disorder severe enough to have repeatedly manifested itself by overt acts, refers to those diagnosed personality disorders that involve

what is called, "acting out" behavior. These personality problems relate to poor social judgment, impulsivity, and disregard or antagonism toward authority, especially rules and regulations. History of longstanding behavioral problems, whether major (criminal), or relatively minor (truancy, military misbehavior, petty criminal and civil indiscretions, and social instability), is necessary for a diagnosis. Certainly, driving infractions and previous failures to follow aviation regulations are prime examples of these acts.

2. The category of psychosis includes the schizophrenias and the manic depressive illnesses along with some other rarer conditions. Since these invariably lead to hospitalization and severe disruption of life patterns, any such indications from the history form will be helpful. Any indication of grossly unusual or bizarre behavior on examination is noteworthy.

3. Alcoholism is a condition where the loss of control over alcohol consumption is accompanied by various deleterious effects on physical health as well as personal or social functioning. One of the primary deleterious effects of alcoholism is in the area of safety, both personal and public. There are many other strong indicators of the presence of alcoholism in the history and physical examination. A history of treatment for alcohol-related problems, a history of arrests, including charges of driving under the influence of alcohol and a history of vocational and marital disruption related to alcohol consumption are important indicators. Alcohol on the breath at the time of routine physical examination should arouse a high index of suspicion. Consumption of alcohol sufficient to cause liver damage is an indication of the presence of alcoholism.

4. Drug dependence refers to the use of drugs of dependence which include sedative tranquilizers and soporifics, narcotic drugs, and amphetamines. (The use of hallucinogens is not considered under this category.) A history of dependence is difficult to demonstrate without documentary evidence, usually found through followup of information in the history.

C. Nonmandatory Denials

With respect to findings by the Federal Air Surgeon of personality disorders, neuroses, and mental conditions that make an applicant unable to safely perform the duties of an airman, we are concerned with conditions of limited duration and/or widely varying severities. Under this nonmandatory denial category we are concerned with significant depressive episodes requiring treatment, even if only outpatient therapy. If severe enough to cause some disruption of vocational or educational activity, if requiring medication or if involving suicidal ideation, these episodes are disqualifying.

Though they may be rare in occurrence, severe neurotic problems, especially severe anxiety and phobias associated with some aspect of flying are considered significant.

Organic brain diseases, even when considered as nonpsychotic in nature, are considered disqualifying whether they are due to trauma, toxic exposure, or arteriosclerotic or other degenerative changes. The use of any psychotropic drugs may be considered disqualifying if they are taken regularly, or, as in the case of some hallucinogens, the use is associated with long-term recurrent effects. This includes all sedative, major tranquilizers, and antidepressant drugs. The use of lithium and homeopathic doses of some antidepressants taken prophylactically may be considered by the FAA to be safe under certain circumstances, if the underlying condition is not disqualifying. The Examiner should not issue a certificate in those circumstances but should defer issuance and forward the medical records to the Aeromedical Certification Branch, AAC-130.

Some personality disorders and situational reactions may be considered temporarily disqualifying. These include such conditions as gross immaturity in a young applicant, and personality disorders without overt acts.

ITEM 48. GENERAL SYSTEMIC

NORMAL	CHECK EACH ITEM IN APPROPRIATE COLUMN *(Enter NE if not evaluated)*	ABNORMAL	NOTES
	48. General systemic		

I. FEDERAL AVIATION REGULATIONS

A. All Classes: FAR 67.13, .15, and .17 (f)(2).

***No other organic functional or structural defect, disease, or limitation that the Federal Air Surgeon finds --

Makes the applicant unable to safely perform the duties or exercise the privileges of the airman certificate that he holds or for which he is applying; or

May reasonably be expected, within 2 years after the finding, to make him unable to perform those duties or exercise those privileges;

and the findings are based on the case history and appropriate, qualified, medical judgment relating to the condition involved.

II. EXAMINATION PROCEDURES

A. Equipment

No special equipment is required.

B. Examination Techniques

While no special procedures are recommended for Item 48, this last item of the section requiring the physician's personal attention should be a convenient reminder to perform an overview or general systemic appraisal of all positive or abnormal findings. Additional medical history may be indicated by these findings. Value judgments should be made for each finding as to its significance to performance decrement and aviation safety.

III. DISPOSITION

The following findings are disqualifying for Examiner issuance of a medical certificate. Further consideration may be obtained by written appeal. Other general systemic conditions may also disqualify.

A. Item 48 - General Systemic

1. Body build: any congenital or acquired defect which would adversely affect flying safety or endanger the individual's well-being if permitted to fly.

Note - height and weight recorded by the applicant must be checked by the Examiner in the course of the examination.

While obesity in itself is not disqualifying, related conditions or diseases may be.

2. Allergies: mild seasonal allergies are not disqualifying but federal regulations require

that the applicant not fly during those times when symptoms are acute or medications are required.

Densensitization injections are not disqualifying if the applicant is otherwise qualified and is experiencing no residual symptoms or adverse reactions. For example, a pilot with allergic rhinitis who is experiencing only local reactions from densensitization and who requires no antihistamines or decongestant medication could be issued a medical certificate of any class if he/she is otherwise qualified and any residual symptoms of the allergy (i.e., nasal stuffiness) are transitory and mild. The Examiner should record in Item 61 of the application the period and duration of any allergic symptoms.

3. Malignancies disqualify until completely eradicated. Surgery for cancer is not disqualifying per se, unless a radical procedure is required that results in significant loss in functions or processes necessary to aviation safety.

When sufficient time has elapsed for recovery from the adverse effects of the eradication procedure, the applicant may receive consideration by the FAA upon written request. A report from the treating physician should be submitted along with all medical and surgical records. When found qualified, the FAA will issue a medical certificate. Followup reports may be required at specified intervals depending upon the site of the malignancy, post-operative progress, prognosis, metastases, lapse of time since surgery or related symptoms, use of medication, and other pertinent historical data.

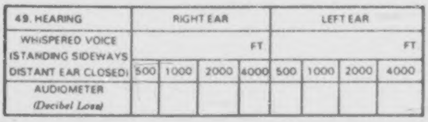
CHAPTER 4

Examination Techniques & Criteria for Qualification
Items 49-64 of FAA Form 8500-8

This chapter provides guidance for completion of Items 49-64 of the Application for Airman Medical Certificate or Airman Medical Student Pilot Certificate. The conduct of the examinations required for the completion of Items 49-60 may be delegated to a qualified physician's assistant, nurse, aide, or laboratory assistant. Regardless of who performs the tests, the Examiner is responsible for the accuracy of the findings. This responsibility may not be redelegated.

After all routine evaluations and tests are completed, the Examiner should make a complete review of the FAA Form 8500-8 (front and back). If complete and accurate, final comments should be added, qualification decision statements should be made, and the Examiner should sign the declaration. The front of the FAA Form 8500-8 is to be in the handwriting of and signed by the applicant. The reverse is to be signed by the Examiner. The reverse side of the form to be sent to the FAA should be typed so that the data may be easily converted for computer processing and to avoid problems in interpreting handwriting.

ITEM 49. Hearing



49. HEARING	RIGHT EAR				LEFT EAR			
WHISPERED VOICE (STANDING SIDEWAYS DISTANT EAR CLOSED)	FT				FT			
	500	1000	2000	4000	500	1000	2000	4000
AUDIOMETER *(Decibel Loss)*								

I. FEDERAL AVIATION REGULATIONS

A. First-Class: FAR 67.13

***Ability to:

***Hear the whispered voice at a distance of at least 20 feet with each ear separately; or

***Demonstrate a hearing acuity of at least 50% of normal in each ear throughout the effective speech and radio range as shown by a standard audiometer.

B. Second-Class: FAR 67.15

***Ability to hear the whispered voice at 8 feet with each ear separately.

C. Third-Class: FAR 67.17

***Ability to hear the whispered voice at 3 feet.

II. EXAMINATION PROCEDURES

A. Whispered Voice

For first-class certification, the applicant must be stationed 20 feet from the Examiner with the ear being tested turned toward the Examiner. The other ear is covered. Using the breath which remains after a normal expiration, the Examiner whispers words or random numbers such as 66, 18, 23, etc. The Examiner should not use only sibilants (S-sounding test materials). The distance, in feet, at which the applicant is able to repeat correctly the test numbers or words is noted and recorded on FAA Form 8500-8. For second- and third-class certification, the same procedure is used except that the second-class applicant shall be examined at a distance of 8 feet and a third-class applicant at 3 feet.

Table I

CLASS		STANDARDS, in feet
1	EACH EAR	20
2	EACH EAR	8
3	EITHER EAR	3

The opposite ear is tested in the same manner. A third-class applicant who can hear the whispered voice test material at 3 feet with either ear is qualified in respect to hearing.

B. Audiometric

1. Standard

An applicant for first-class certification may be examined by either the whispered voice test or by audiometry. The FAR requirements expressed as audiometric standards, (International Standards Organization (ISO) calibration) are as follows:

Table II

CLASS/EAR	500	1,000	2,000HZ
1 EITHER	40	35	35

If the first-class applicant fails the whispered voice test, the audiometric test should be administered. If the applicant fails the audiometric test and the whispered voice test had not been administered, that test should be performed to determine if the standard applicable to that test can be met. For second- and third-class certification, the FAR does not provide for audiometric testing. Therefore, the whispered voice test must be conducted to determine whether the applicant is qualified. Audiometry may be performed as a service to the applicant, but may not be used as a criterion for qualification.

2. Equipment

a. Approval. The FAA does not approve or designate specific audiometric equipment for use by Examiners. Equipment used for FAA testing must accurately and reliably cover the necessary frequencies (500, 1,000, and 2,000 HZ) and have adequate step features.

Since every audiometer manufactured in the USA for screening and diagnostic purposes is built to meet appropriate standards, most audiometers should be acceptable as long as they are maintained in proper calibration and used in an adequately quiet place.

b. Calibration. It is critical that any audiometer be periodically calibrated to assure its continued accuracy. Annual calibration is recommended. Also recommended is the further safeguard of an occasional audiogram on a "known" subject or staff member between calibrations and especially at any time that a test result unexpectedly varies significantly from those hearing levels clinically expected. This provides an approximate "at threshold" calibration.

c. ASA/ISO. Older audiometers were often calibrated to meet the standards specified by the USA Standards Institute (USASI), formerly the American Standards Association (ASA). These standards were based upon a U.S. Public Health Service survey. Newer audiometers are calibrated so that the zero hearing threshold level is now based upon laboratory measurements rather than the survey. These measurements led to the 1964 International Standards Organization (ISO) specifications. Audiometers built to this standard have calipers or dials that read in ISO values. For these reasons it is very important for every audiogram submitted (or values reported under Item 49 on FAA Form 8500-8) to have a note indicating whether it is ASA or ISO. Only then can the FAA standards be appropriately applied.

ASA or USASI values can be converted to ISO by adding corrections as follows:

Frequency (HZ) -	500,	1,000,	2,000
Decibels Added -	14	10	8.5

III. DISPOSITION

A. Special Issuances

Applicants who do not meet the auditory standards may be found eligible for a special issuance and a Statement of Demonstrated Ability. Applicants seeking a special issuance must make the request in writing to the Aeromedical Certification Branch, AAC-130. A determination of qualifications will be made on the basis of a special medical examination, a medical flight test, or operational experience.

1. Unilateral Deafness

In congenital or acquired complete unilateral deafness, an applicant may be considered for special issuance, particularly if there is good hearing in the remaining ear. These individuals may be able to demonstrate their ability to operate in the system safely with a minimum of restrictions or limitations.

NOTE: Third-class applicants need only hear with one ear in order to meet the standard.

2. Bilateral Deafness

It is possible for a totally deaf person to qualify for a private pilot certificate. On initial application for medical certification, if the applicant is otherwise qualified, the Aeromedical Certification Branch, AAC-130, may issue a combination medical/student pilot certificate with the limitation "Valid for Student Pilot Purposes Only" as well as the limitation "Not Valid for Control Zones or Areas Where Radio Communication is Required." This will enable the applicant to proceed with training to the point of his/her private pilot checkride.

When the student pilot's instructor confirms the student's eligibility for a private pilot checkride, the applicant should submit a written request to the Aeromedical Certification Branch, AAC-130, for an authorization for a medical flight test. This test will be given in conjunction with the checkride by an FAA inspector. Upon successful completion of the test, a third-class medical certificate and Statement of Demonstrated Ability will be issued. Pilot activities will be restricted to areas where radio communication is not required.

3. Hearing Aids

Under some circumstances, the use of hearing aids may be acceptable. The applicant will be required to qualify for a Statement of Demonstrated Ability. In examining an applicant previously "waivered," the Examiner should personally review the Statement of Demonstrated Ability or other documents that spell out the extent of hearing loss previously cleared by the FAA.

Some pilots who normally wear hearing aids to assist in communicating while on the ground report that they elect not to wear them while flying. They prefer to use the volume amplification of the radio headphone. Some use the headphone on one ear for radio communication and the hearing aid in the other ear for cockpit communications.

4. Stapedectomy

A history of stapedectomy is not necessarily disqualifying for medical certification. Each case is evaluated by the FAA on an individual basis following review of the otologist's report of surgery. The type of prosthesis used, the applicant's adaptability and progress following surgery, and the extent of hearing acuity attained are all major factors to be considered. The Examiner is asked to defer issuance to an applicant presenting a history of stapedectomy for the first time, sending the completed Report of Medical Examination, with all available supplementary information, to the Chief, Aeromedical Certification Branch, AAC-130.

ITEM 50. Distant Vision

50. DISTANT VISION *(Standard test types only)*		
RIGHT EYE	20/	CORRECTED TO 20/
LEFT EYE	20/	CORRECTED TO 20/
BOTH EYES	20/	CORRECTED TO 20/

I. FEDERAL AVIATION REGULATIONS

A. First- and Second-Class; FAR 67.13, .15(b)(1)

***Distant visual acuity of 20/20 or better in each eye separately, without correction; or of at least 20/100 in each eye separately corrected to 20/20 or better with corrective lenses (glasses or contact lenses) in which case the applicant may be qualified only on the condition that he wears those corrective lenses while exercising the privileges of his/her airman certificate.

B. Third-Class; FAR 67.17(b)(1)

Distant visual acuity of 20/50 or better in each eye separately, without correction; or if the vision in either or both eyes is poorer than 20/50 and is corrected to 20/30 or better in each eye with corrective lenses (glasses or contact lenses), the applicant may be qualified on the condition that he/she wears those corrective lenses while exercising the privileges of his/her airman certificate.

II. EXAMINATION PROCEDURES

A. Equipment

1. Snellen 20-foot eye chart.
2. Acceptable substitutes: Projector with screen; Keystone Orthoscope; Bausch & Lomb Orthorator; AOC Site-Screener; Titmus Optical Vision Tester; Keystone Telebinocular.

B. Examination Techniques

1. Each eye will be tested separately, and both eyes together.

2. Snellen eye charts may be used as follows:

   a. The Snellen chart should be illuminated by a 100-watt incandescent lamp placed 4 feet in front of and slightly above the chart.

   b. The chart or screen is placed 20 feet from the eyes of the applicant and the 20/20 line is placed 5 feet, 4 inches above the floor.

c. A metal, opaque plastic, or cardboard occluder should be used to cover the eye not being examined.

d. The examining room should be darkened with the exception of the illuminated chart or screen.

e. If corrective lenses are worn, the uncorrected acuity should be determined first, followed by a determination of acuity with lenses in place. If contact lenses are worn, see the recommendations in paragraph H of this item.

f. Common errors:

Failure to shield the applicant's eyes from extraneous light.

Permitting the applicant to view the chart with both eyes.

Failure to observe the applicant's face to detect squinting.

Incorrect sizing of projected chart letters for a 20-foot distance.

Failure to focus the projector sharply.

Failure to obtain the corrected acuity when the applicant wears glasses.

Failure to note and to require the removal of contact lenses.

3. Directions furnished by the manufacturer or distributor will be followed when using substitute devices for the above testing.

III. DISPOSITION

A. When correcting lenses are required to meet the standards, an appropriate limitation will be placed on the medical certificate. For example, when lenses are needed for distant vision only:

"Holder shall wear correcting lenses while exercising the privileges of his/her airman certificate."

For combined defective distant and near visual acuity, the appropriation limitation is:

"Holder shall wear lenses that correct for distant vision and possess glasses that correct for near vision while exercising the privileges of his/her airman certificate." See also Item 51, Near Vision.

B. Applicants who fail to meet these standards and have no Statement of Demonstrated Ability ("waiver") that covers the extent of visual acuity defect found on examination, may obtain further consideration by the FAA for certification by submitting a report of an eye evaluation. The Examiner can help to expedite the review procedure by attaching to the application form (FAA Form 8500-8) a copy of FAA Form 8500-7, Report of Eye Evaluation, after its completion by an eye specialist. If submission of the examination report (FAA Form 8500-8) to Oklahoma City will be delayed for 14 days or more in order to attach the Report of Eye Evaluation, it is recommended that the two forms be mailed to the FAA separately.

C. FAA Form 8500-7, Report of Eye Evaluation is not stocked by physicians other than Aviation Medical Examiners. The form is for special use, and is not routinely required for applicants. Applicants with visual acuity problems may be referred to either an optometrist or ophthalmologist. Applicants with eye disease should be referred only to an ophthalmologist (e.g., glaucoma).

D. Amblyopia

In amblyopia ex anopsia, there is a decrease in visual acuity of one eye in the absence of organic eye disease, usually due to strabismus or anisometropia in childhood. In amblyopia ex anopsia the visual acuity loss is simply recorded under Item 50 of the FAA Form 8500-8, and visual standards are applied as usual. Where the standards are not met, a Report of Eye Evaluation, FAA Form 8500-7, should be submitted with the Report of FAA Medical Examination.

E. Aphakia

Since there is no limit for the uncorrected vision of a third-class applicant, the Examiner may issue a medical certificate to an aphakic third-class applicant, if:

1. Fully recovered postoperatively and stable.

2. There is no other pathology of the eye.

3. The visual standard of 20/30 is achieved in the aphakic eye(s) with use of corrective contact lens(es), and near vision corrects adequately with spectacles.

First- and second-class applicants who have had cataract surgery should be deferred issuance of a certificate and all reports submitted to Oklahoma City for further consideration.

F. Contact Lenses

Experience has indicated no significant risk to aviation safety in the use of contact lenses for distant vision correction. As a consequence, no special evaluation is routinely required before use is authorized and no Statement of Demonstrated Ability ("waiver") is required or issued to the contact lens wearer who has no complications. However, contact lenses that correct near visual acuity only or that are bifocal are generally not considered acceptable for aviation duties.

Careful evaluation of the eye by the Examiner continues to be of major importance. Issuance should be deferred if the Examiner finds evidence of lens irritation or a tinted lens that causes significant diminution of transmitted light. It is recommended that the Examiner's receptionist ask new applicants if they use contact lenses and, if so, to advise them to remove the lens for 24 hours before appearing for examination if at all possible. This procedure serves to overcome the difficulty in determining uncorrected visual acuity that would have been altered by corneal molding from wearing of the contact lenses. When there has been a recent examination by an eye specialist, the Examiner may wish to contact that specialist for pertinent information. The Examiner should indicate on the report of FAA physical examination (FAA form 8500-8) how the uncorrected distant visual acuity values were obtained, and the length of time lapse between removal of the lenses and testing.

G. Monocularity

Detailed procedures have long existed to allow the one-eyed pilot to demonstrate his/her ability to compensate for the loss and to perform airman duties without threat to aviation safety. The Examiner may not issue a medical certificate of any class to a monocular applicant unless he/she presents written evidence of prior clearance by the FAA for the monocularity. The Examiner may assist the applicant in the initial steps toward obtaining such clearance by submitting a Report of Eye Examination, FAA Form 8500-7, along with the application, FAA Form 8500-8, and any other available information from the applicant's treating ophthalmologist. An airman is considered to have monocular vision if the best corrected central visual acuity in an eye is 20/200 or worse.

If the loss of the eye occurred within the past 6 months, the applicant with monocular vision should be advised to postpone his/her efforts to qualify for medical certification. A waiting period of at least 6 months is recommended to assure stability and to permit an adequate adjustment period for developing the ability to compensate for monocular vision. (See Depth Perception, paragraph G of Item 55.)

Depending upon the visual acuity of the good eye (uncorrected distant visual acuity must not be worse than 20/200 and refractive error should not be greater than ±3.5 diopters, spherical equivalent), the applicant who is otherwise qualified may be issued a medical certificate by the FAA with a limitation "Valid for Student Pilot Purposes Only." When the applicant meets the flight experience requirements for the pilot certificate, a medical flight test will be authorized by the FAA. This test may be conducted along with the regular flight check for a pilot's license. When the student's instructor believes that he/she is about ready for testing, the student should request, in writing, the authorization for the flight test from the Aeromedical Certification Branch, AAC-130. The student should indicate the General Aviation District Office he/she wishes to use (may be an Air Carrier District Office for first-class applicants).

If the applicant is able to demonstrate adequate compensation for monocularity, a Statement of Demonstrated Ability ("waiver") and the appropriate medical certificate will be issued without the student pilot limitation.

The one-eyed pilot is not restricted to private pilot status. With flight experience the airman may qualify for additional pilot certificates and ratings. Appropriate medical flight tests may be given, usually in conjunction with the corresponding check-ride.

H. Nystagmus

Nystagmus of recent onset is cause to deny or defer certificate issuance. Any recent neurological or other evaluations available to the Examiner should be submitted to Oklahoma City along with the Report of FAA Medical Examination, FAA Form 8500-8. Where nystagmus has been present for a number of years and has not recently worsened, it is usually necessary to consider only the impact that the nystagmus has upon visual acuity. The Examiner should be aware of how nystagmus may be aggravated by the forces of acceleration commonly encountered in aviation and by poor illumination. The addition of related history on FAA Form 8500-8, Item 60, is most helpful to the Aeromedical Certification Branch, AAC-130.

I. Sunglasses

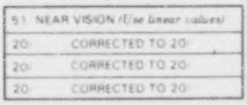
Airmen should be encouraged to use sunglasses in bright daylight but must also be cautioned that, under conditions of low illumination, they may compromise vision. Sunglasses are not acceptable as the only means of correction to meet visual standards, but may be used for backup purposes if they provide the necessary correction.

J. Intraocular Lens Implants

Lens implants are cause for the Examiner to deny or defer medical certificate issuance unless the applicant has a Statement of Demonstrated Ability ("waiver") or other written evidence that he/she has been cleared by the FAA.

An applicant with an implant not previously reported may be considered by Oklahoma City for possible issuance upon receipt of the results of a complete ophthalmological evaluation.

ITEM 51. Near Vision



51. NEAR VISION *(Use linear values)*	
20/	CORRECTED TO 20/
20/	CORRECTED TO 20/
20/	CORRECTED TO 20/

I. FEDERAL AVIATION REGULATIONS

A. First-Class: FAR 67.13(b)(2)

***Near vision of at least v=1.00 at 18 inches with each eye separately, with or without corrective glasses.

B. Second-Class: FAR 67.15(b)(2)

***Enough accommodation to pass a test prescribed by the Administrator based primarily on ability to read official aeronautical maps.

C. Third-Class: FAR 67.17(b)(2)

***No serious pathology of the eye.

II. EXAMINATION PROCEDURES

A. Equipment

1. FAA Form 8500-1, Near Vision Acuity Test Card.

2. Acceptable substitutes:

Keystone Orthoscope
AOC Site-Screener
Bausch & Lomb Orthorator
Titmus Optical Vision
Tester
Keystone Telebinocular

B. Examination Techniques

1. Near visual acuity is determined for each eye separately and for both eyes together. Test values are recorded both with and without correcting glasses when glasses are worn or required to meet the standards. Bifocal contact lenses or contact lenses that correct for near visual acuity only are not considered acceptable.

2. FAA Form 8500-1, Near Vision Acuity Test Card should be used as follows:

a. The examination is conducted in a well-lighted room with the source of light behind the applicant.

b. The applicant holds the card 16 inches from the eyes in such a position as to provide uniform illumination. To assure the card is held at exactly 16 inches from the eyes, it is suggested that a string of that length be attached to the card. The print size of the FAA test card, held at 16 inches, provides an equivalent test to that prescribed for first-class applicants at 18 inches in FAR 67.13(b)(2).

c. Each eye is tested separately, with the other eye covered. Both eyes are then tested together.

d. The smallest type correctly read with each eye separately and both eyes together is recorded in linear value. In performing the test using FAA Form 8500-1, the level of visual acuity will be recorded as the line of smallest type the applicant reads most accurately. The applicant should be allowed no more than two misread letters on any line.

e. Common errors:

(1) Inadequate illumination of the test card.

(2) Failure to hold card specified distance from the eye.

(3) Failure of the Examiner to assure that the untested eye is covered.

(4) Failure to determine uncorrected and corrected acuity when the applicant wears glasses.

f. Practical Test. At the bottom of FAA Form 8500-1 there is a section for Aeronautical Chart Reading. Letter types and charts are reproduced from aeronautical charts in their actual size. This may be utilized when a borderline condition exists at the certifiable limits of an applicant's vision. If successfully completed, a favorable certification action may be taken.

3. Acceptable substitute instruments may be used, following the directions accompanying the instruments.

III. DISPOSITION

A. Equivalent Standards

1. First- and second-class certification: applicant must demonstrate at least 20/40 with each eye separately, with or without correction.

2. Third-class: applicant must demonstrate at least 20/60 with each eye separately with or without correction.

B. Lenses and Limitations

When correcting glasses are required to meet the near vision standards, an appropriate limitation will be placed on the medical certificate. Contact lenses that correct only for near visual acuity are not considered acceptable for aviation duties.

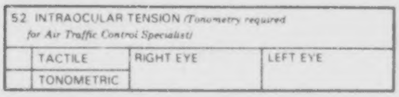
In a borderline situation such as a third-class applicant with 20/60 near vision, corrected to 20/20 with prescription glasses already in hand, it is recommended that the Examiner enter the limitation for near vision corrective glasses on the medical certificate. If the uncorrected near vision is worse than 20/60, then the third-class applicant must have glasses that correct to at least 20/60 and the near vision limitation must appear on the certificate.

For all classes, the appropriate wording for the near vision limitation is "Holder shall possess correcting glasses for near vision while exercising the privileges of his/her airman certificate." Possession only is required since it would be hazardous to have distant vision obscured by the continuous wearing of reading glasses.

For combined defective distant and near visual acuity, the appropriate limitation is:

"Holder shall wear lenses that correct for distant vision and possess glasses that correct for near vision while exercising the privileges of his/her airman certificate."

ITEM 52. Intraocular Tension



52 INTRAOCULAR TENSION *(Tonometry required for Air Traffic Control Specialist)*			
☐	TACTILE	RIGHT EYE	LEFT EYE
☐	TONOMETRIC		

I. FEDERAL AVIATION REGULATIONS

A. First-Class: FAR 67.13(b)(5)

***No acute or chronic pathological condition of either eye or adenexae that might interfere with its proper function, might progress to that degree, or might be aggravated by flying.

B. Second-Class: FAR 67.15(b)(4)

***No pathology of the eye.

C. Third-Class: FAR 67.17(b)(2)

***No serious pathology of the eye.

II. EXAMINATION PROCEDURES

The digital method for assessing intraocular tension is recognized as being inaccurate. Because of increased ocular disease incidence, it is recommended that applicants who are 40 years of age or older be examined by tonometry.

III. DISPOSITION

A. If an intraocular tension of 24 mm Hg is recorded or if there is a difference of 5 mm Hg or greater between the two eyes, the applicant should be referred to an ophthalmologist. FAA Form 8500-14, Ophthalmological Evaluation for Glaucoma, should be provided for completion by the ophthalmologist.

The Examiner should deny or defer issuance of a medical certificate to an applicant for any class certificate who is found to have an elevated intraocular pressure or who presents with a history of glaucoma.

B. Special Issuance

Special issuance by the FAA is made on an individual basis. Since secondary glaucoma is due to known pathology such as uveitis or trauma, eligibility must largely depend upon that pathology. Secondary glaucoma is often unilateral and if the cause or disease process is no longer active and the other eye remains normal, certification is likely.

In primary glaucoma, those with closed angle, narrow angle, or angle closure are usually denied because of the possibilities of unanticipated acute rise in pressure, severe pain, nausea, transitory loss of accommodative power, blurred vision, halos, epiphora, or iridoparesis. Central venous occlusion can occur with catastrophic loss of vision. However, when surgery such as iridectomy or iridencleisis is performed satisfactorily over 3 months prior to application, the likelihood of difficulties is considerably more remote and some of these individuals have been favorably considered.

The applicant with unilateral or bilateral open angle glaucoma may be certified by the FAA (with followup required) when a current ophthalmological report substantiates that pressures are under adequate control, there is little or no visual field loss or other complications, and the applicant tolerates small to moderate doses of allowable medications. A few applicants have been certified following demonstration of adequate control with oral medication (Diamox). Neither the miotics or mydriatics are medically disqualifying. However, miotics such as pilocarpine do cause pupillary constriction and could conceivably interfere with night vision. While the FAA no longer routinely prohibits these individuals from flying at night, it may be worthwhile for the Examiner to discuss this aspect of the use of miotics with applicants. Where considerable disturbance in night vision is documented, the FAA may limit the medical certificate: "NOT VALID FOR NIGHT FLYING."

ITEM 53. Color Vision

53. COLOR VISION *(Test used, number of plates missed)*

I. FEDERAL AVIATION REGULATIONS

A. First-Class: FAR 67.13(b)(3)

***Normal color vision.

B. Second-Class: FAR 67.15(b)(5)

***Ability to distinguish aviation signal red, aviation signal green, and white.

C. Third-Class: FAR 67.17(b)(3)

***Ability to distinguish aviation signal red, aviation signal green, and white.

II. EXAMINATION PROCEDURES

A. Equipment

1. Pseudoisochromatic plates. (Dvorine, 2nd edition; AOC, revised edition or AOC-HRR; Ishihara, 16-, 24-, or 38-place editions.)

2. Acceptable substitutes:

Eldridge-Green Color Perception Lantern
Farnsworth Lantern
Keystone Orthoscope
Keystone Telebinocular
SAMCTT (School of Aviation Medicine Color Threshold Tester)
Titmus Optical Vision Tester

B. Techniques

1. The plates to be demonstrated for each of the approved pseudoisochromatic tests are:

Test	Edition	Plates
AOC	Revised	1-18
Dvorine	2nd	1-15
Ishihara	16-Plate	1-8
Ishihara	24-Plate	1-15
Ishihara	38-Plate	1-21
AOC-HRR	2nd	1-6*

*If any error, show 12-14

2. The following conditions should be assured when testing with pseudoisochromatic plates:

a. Test book at 30 inches from applicant.
b. Illumination of plates by at least 20-foot candles. (If artificial light is used it must be "daylight," fluorescent, or 100-watt blue daylight bulb.)
c. Three seconds allowed for applicant to interpret and respond to a given plate.

3. Testing procedures for the Farnsworth and Eldridge-Green lanterns and for the SAMCTT, Keystone, and Titmus testers accompany the instruments.

4. The test used and results (pass or fail) are recorded.

III. DISPOSITION

An applicant is determined not to meet color vision standards if testing reveals:

A. Class I

1. Four or more errors in American Optical Company pseudoisochromatic plates (revised edition, 18 plates).

2. Three or more errors in plates 1-15 of Dvorine pseudoisochromatic plates (second edition, 15 plates).

3. Two or more errors on plates 1-8 of the 16-plate edition of Ishihara pseudoisochromatic plates. Three or more errors on plates 1-15 of the 24-plate edition of Ishihara pseudoisochromatic plates. Four or more errors on plates 1-21 of the 38-plate edition of Ishihara pseudoisochromatic plates.

4. Farnsworth Lantern test: an average of more than one error per series of nine color pairs.

5. Score of 49 or less on SAMCTT (School of Aviation Medicine Color Threshold Tester).

6. Any errors in plates 1-6 of American Optical-HRR test (second edition, 20 plates).

7. Any errors, Tests A, B, and C, of Eldridge-Green Color Perception Lantern. (See instruction booklet.)

8. Any errors, six test plates of the Titmus Vision Tester; any errors Keystone Orthoscope or Keystone Telebinocular. (See instruction booklets.)

B. Classes II and III

1. Thirteen or more errors in American Optical Company pseudoisochromatic plates (revised edition, 18 plates).

2. Twelve or more errors on plates 1-15 of Dvorine pseudoisochromatic plates (second edition, 15 plates).

3. Four or more errors on plates 1-8 of the 16-plate edition of Ishihara pseudoisochromatic plates. Seven or more errors on plates 1-15 of the 24-plate edition of Ishihara pseudoisochromatic plates. Nine or more errors on plates 1-21 of the 38-plate pseudoisochromatic plates.

4. Farnsworth Lantern test: An average of more than one error per series of nine color pairs.

5. Score of 49 or less on SAMCTT (School of Aviation Medicine Color Threshold Tester).

6. AO-HRR (second edition, 20 plates): Any error in plates 12-14.

7. Any error, Test A, Eldridge-Green Lantern. (See instruction booklet.)

8. Any errors, Titmus Vision Tester or Keystone Orthoscope or Keystone Telebinocular. (See instruction booklets.)

C. Certificate Limitation

If an applicant fails to meet the color vision standard as interpreted above but is otherwise qualified, a medical certificate may be issued bearing the limitation: "Not valid for night flying or by color signal control."

D. Special Issuance

An applicant who holds a medical certificate bearing a color vision limitation may request reevaluation or special issuance. This should be in writing and may be directed to the Aeromedical Certification Branch, AAC-130. Upon demonstration of ability to perform the color vision tasks, a medical certificate without limitation is issued with a Statement of Demonstrated Ability (SODA, "waiver").

Demonstration of ability to perform color vision tasks appropriate to the certificate applied for may entail a medical flight test or a signal light test. Where a signal light test or medical flight test is required, an authorization for the test will be provided by the FAA. The signal light test may be given at any time during flight training. The medical flight test is usually given in conjunction with the required flight test for a pilot certificate, when the pilot has accumulated the necessary flight experience. The medical flight test is most often required when an airman with borderline color vision wishes consideration for upgrading his/her certificate.

E. X-Chrom Lens

This lens is not acceptable to the FAA as a means for correcting color deficiencies of pilots.

F. Yarn Test

Yarn tests are not acceptable methods of testing for the FAA medical certificate.

ITEM 54. Field of Vision

54 FIELD OF VISION	
RIGHT EYE	LEFT EYE

I. FEDERAL AVIATION REGULATIONS

A. First-Class: FAR 67.13(b)(4)

Normal fields of vision.

B. Second-Class: FAR 67.15(b)(3)

Normal fields of vision.

D. Third-Class: FAR 67.17(b)(2)

No serious pathology of the eye.

II. EXAMINATION PROCEDURES

A. Equipment

1. Fifty-inch square black matte surface wall target with center white fixation point; 2 mm white test objects on black-handled holder.

2. Acceptable substitute:

Standard perimeter.

B. Techniques

1. Wall target

a. Applicant will be seated 40 inches from the target.
b. Place an occluder over the right eye.
c. Instruct applicant to keep left eye focused on the fixation point.
d. Move the white test object from the outside border of the wall target toward the point of fixation on each of the eight 45 degree radials.

e. The result will be recorded on a worksheet as the number of inches from the fixation point at which the white target is first identified by the applicant on each radial.

f. Repeat the test with the left eye occluded and the right eye focusing on the fixation point.

2. Alternative Procedure

A standard perimeter may be used in place of the above procedure. With this method, any significant deviation from normal field configuration will require evaluation by an ophthalmologist.

III. DISPOSITION

A. Ophthalmological Consultations

If an applicant fails to identify the target in any presentation at a distance of at least 23 inches from the fixation point, evaluation by an ophthalmologist must be requested. This is a requirement for all classes of certification. FAA Form 8500-14, Ophthalmological Evaluation for Glaucoma, should be provided by the Examiner to the applicant for use by the ophthalmologist if glaucoma is suspected.

If the applicant refuses further evaluation, the Examiner should enter "abnormal" in Item 54 of FAA Form 8500-8, defer issuance of the certificate, and forward the application with an explanation to the Aeromedical Certification Branch, AAC-130.

B. Glaucoma

Note any current use of medication (Item 15), medical history (Item 21), medical treatment (Item 22), visual acuity loss (Items 50 and 51), and intraocular hypertension (Item 52) for further evidence which may indicate the presence of glaucoma or other disorders which may be associated with a loss of visual field. The disposition of those applicants with confirmed or suspected glaucoma is given in detail under Item 52, Intraocular Tension, of this chapter.

ITEM 55. Heterophoria Diopters

55 HETEROPHORIA DIOPTERS *(Not required for Class Three)*				
DISTANCE	ESOPHORIA	EXOPHORIA	RIGHT H	LEFT H

I. FEDERAL AVIATION REGULATIONS

A. First- and Second-Class: FAR 67.13 and .15(b)(6)

***Bifoveal fixation and vergence-phoria relationship sufficient to prevent a break in fusion under conditions that may reasonably occur in performing airman duties.

Tests for the factors named in this paragraph are not required except for applicants found to have more than one prism diopter of hyperphoria, six prism diopters of esophoria, or six prism diopters of exophoria. If these values are exceeded, the Federal Air Surgeon may require the applicant to be examined by a qualified eye specialist to determine if there is bifoveal fixation and adequate vergencephoria relationship. However, if the applicant is otherwise qualified, he/she is entitled to a medical certificate pending the results of the examination.

C. Third-Class:

***No standards.

II. EXAMINATION PROCEDURES

A. Equipment

1. Red Maddox rod with handle.

2. Horizontal prism bar with graduated prisms beginning with one-prism diopter and increasing in power to at least eight-prism diopters.

3. Acceptable substitutes:

Maddox rod and Risley rotary prism
Maddox rod and individual prisms
Keystone Orthoscope
Bausch & Lomb Orthorator
AOC Site-Screener
Titmus Optical Vision Tester
Keystone Telebinocular

B. Techniques

Test procedures to be used accompany the instruments. If specific instructions for use of the horizontal prism bar and red Maddox rod are required by the Examiner, these may be obtained from the Regional Flight Surgeon.

III. DISPOSITION

	Maxima, in diopters		
Class	Eso	Exo	Hyperphoria
First	6	6	1
Second	6	6	1
Third	Testing Not Required		

A. Third-Class

These applicants are not required to undergo heterophoria testing. However, if there is strabismus or a history of diplopia, the issuance of a certificate should be deferred and the application forwarded to the Aeromedical Certification Branch, AAC-130. If the applicant wishes further consideration, the Examiner can help expedite review by the FAA by providing the applicant with a copy of FAA Form 8500-7, Report of Eye Evaluation. FAA Form 8500-8 may be held by the Examiner pending receipt of the eye report, Form 8500-7, if a delay of no more than 14 days is expected. Otherwise, Form 8500-8 should be forwarded immediately to the Aeromedical Certification Branch with a notation that a specialty report will follow.

B. First- and Second-Class

When the heterophoria standards are exceeded but there is no serious eye pathology and all other aspects of examination are favorable, the Examiner should not withhold the medical certificate. Rather, the applicant should be advised that the FAA may require further examination by a qualified eye specialist.

C. Diplopia

Any applicant with a history of diplopia should be denied or deferred unless written evidence is provided that the FAA has previously considered the individual and determined that his/her special circumstance is not adverse to flight safety.

ITEM 56. Blood Pressure

56. BLOOD PRESSURE		
RECUMBENT, MM MERCURY	SYSTOLIC	DIASTOLIC

I. FEDERAL AVIATION REGULATIONS

A. First-Class: FAR 67.13(e)(4)

***Unless the adjusted maximum readings apply, the applicant's reclining blood pressure may not be more than the maximum reading for his/her age group in the following table:

Age Group	Maximum readings (reclining blood pressure in mm)		Adjusted maximum readings (reclining blood pressure in mm) [1]	
	Systolic	Diastolic	Systolic	Diastolic
20–29	140	88	—	—
30–39	145	92	155	98
40–49	155	96	165	100
50 and over	160	98	170	100

[1] For an applicant at least 30 years of age whose reclining blood pressure is more than the maximum reading for his age group and whose cardiac and kidney conditions, after complete cardiovascular examination, are found to be normal.

B. Second- and Third-Class: Sections 67.15(f)(2) and 67.17(f)(2)

***No other organic, functional, or structural disease, defect, or limitation that the Federal Air Surgeon finds --

Makes the applicant unable to safely perform the duties or exercise the privileges of the airman certificate that he holds or for which he is applying; or

May reasonably be expected within 2 years after the finding, to make him unable to perform those duties or exercise those privileges;

and the findings are based on the case history and appropriate, qualified, medical judgment relating to the condition involved.

Measurement of blood pressure is an essential part of the FAA medical certification examination. Minimal standards have long been established for second- and third-class applicants at 170 mm mercury systolic and 100 mm mercury diastolic maximum pressure. These are resting values and it is presumed that the applicant has not taken any antihypertensive agents for at least 30 days.

II. EXAMINATION PROCEDURES

Blood pressure should be taken with the applicant in the seated position. Any conditions that may adversely affect the validity of the blood pressure reading should be noted.

III. DISPOSITION

A. Examining Options

1. The applicant whose pressures are within the above limits, who have not used antihypertensives for 30 days, and who are otherwise qualified shall be issued a medical certificate by the Examiner.

2. The applicant whose blood pressure is slightly elevated beyond the FAA specified limits, may, at the discretion of the Examiner, have pressures repeated (A.M. and P.M. readings on 3 consecutive days is recommended). If the possibility of hypertension remains, even if mild or intermittent, certification should be deferred and the application mailed to the Aeromedical Certification Branch, AAC-130, with a note of explanation.

3. The applicant whose pressure is within limits but who is on antihypertensive medication (or has taken it within the past 30 days) should be denied or deferred and reports forwarded to Oklahoma City. If the applicant was previously cleared by the FAA, the Examiner is

familiar with the applicant's hypertensive history and there have been no adverse changes, the Examiner may issue the certificate, unless issuance has been reserved to the Aeromedical Certification Branch.

4. All other applicants, such as those with abnormal pressures with or without use of antihypertension agents, should be denied or deferred and the report sent to the Aeromedical Certification Branch.

B. Special Issuance

If an applicant desires further consideration by the FAA, a request should be made in writing. Upon review by the FAA of Form 8500-8, the applicant will be asked to provide a report of a cardiovascular evaluation.

Available medical records indicating previous evaluations and treatment are essential on initial workup for the FAA. Also on initial review, a thorough current examination is required to rule out end organ disease. Specifications for the cardiovascular evaluation will be provided by the FAA.

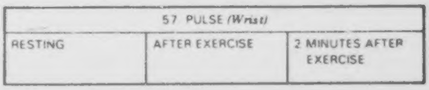
C. Followup Reports

Followup reports required by the FAA may only consist of a statement or periodic report from the treating physician. However, applicants with high levels of hypertension or high risk factors may be requested by the FAA to submit an annual examination report, progress report, ECG, and other studies as individually indicated.

D. Medication

Diuretics are permissable for control of hypertension if the special cardiovascular evaluation required by the FAA reveals no end organ disease. Low doses of approved beta-adrenergic blocking agents are also acceptable. Other antihypertensive medications are not permitted because of the likelihood for complications or side effects.

ITEM 57. Pulse



57. PULSE *(Wrist)*		
RESTING	AFTER EXERCISE	2 MINUTES AFTER EXERCISE

The Federal Aviation Regulations do not specify pulse rates which, per se, are disqualifying for medical certification. These tests are necessary, however, to determine the status and responsiveness of the cardiovascular system. If abnormal, pulse rates may be reason to conduct additional evaluations of the cardiovascular system.

II. EXAMINATION PROCEDURES

A. The initial or resting pulse rate is determined with the individual relaxed in a sitting position.

B. The applicant is directed to hop 20 times on 1 foot within 20 seconds. The Examiner may vary this, allowing for age, structural defects, or general physical condition. The alternative procedure and reason for its use should be reported on the application form (FAA Form 8500-8).

C. The pulse rate will be taken immediately after exercise and again after 2 minutes of rest.

D. Bradycardia of less than 50 beats per minute, any episode of tachycardia during the course of the examination, and any other irregularities of pulse other than an occasional ectopic beat or sinus arrhythmia must be noted and reported.

III. DISPOSITION

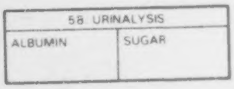
Pulse Rates	Maxima*
At Rest	100
Immediate	120
2-Minute	Resting Rate + 10

*For all classes of medical certification

A. If the pulse rates exceed the maximum levels, if there is bradycardia or tachycardia, or if there is a significant pulse irregularity, deferral of certification is required.

B. A cardiac evaluation may be needed to determine the applicant's qualifications. Temporary stresses or fever may, at times, result in abnormal results from these tests. If the Examiner believes this to be the case, the applicant should be given a few days to recover and then be retested. If this is not possible, the application should be deferred, pending further evaluation.

ITEM 58. Urinalysis



58 URINALYSIS	
ALBUMIN	SUGAR

I. FEDERAL AVIATION REGULATIONS

A. First-, Second-, and Third-Class: FAR 67.13, .15, and .17 (f)

***No established medical history or clinical diagnosis of diabetes mellitus that requires insulin or any other hypoglycemic drug for control;

***No other organic, functional, or structural disease, defect, or limitation that the Federal Air Surgeon finds --

Makes the applicant unable to safely perform the duties or exercise the privileges of the airman certificate that he holds or for which he is applying; or

May reasonably be expected, within 2 years after the finding, to make him unable to perform those duties or exercise those privileges;

and the findings are based on the case history and appropriate, qualified, medical judgment relating to the condition involved.

II. EXAMINATION PROCEDURES

Any standard laboratory procedures are acceptable for these tests.

III. DISPOSITION

A. The urine test in itself is not a cause for denial. However, when an abnormality occurs, subsequent evaluations may lead to denial or deferral, depending upon the underlying condition and/or need for treatment. For example, glycosuria or proteinuria is cause for deferral of medical certificate issuance until additional studies determine the status of the endocrine and/or urinary systems.

B. Additional urinary tests may be requested by the Examiner when indicated by history or examination. These should be reported on FAA Form 8500-8 or attached to the form as an addendum.

C. See also Item 21 (Medical History) and Item 41 (GU System) for related information.

ITEM 59. ECG

59 ECG *(Date)*

I. FEDERAL AVIATION REGULATIONS

A. First-Class: FAR 67.13(e), Cardiovascular

***If the applicant has passed his 35th birthday but not his 40th, he must, on the first examination after his 35th birthday, show an absence of myocardial infarction on electrocardiographic (ECG) examination.

***If the applicant has passed his 40th birthday, he must annually show an absence of myocardial infarction on ECG examination.

An electrocardiogram, made according to acceptable standards and techniques within the 90 days before an examination for a first-class certificate, is accepted at the time of the physical examination as meeting the requirements for the electrocardiogram.

B. All Applicants

Applicants for second- and third-class certification are not routinely required to provide electrocardiograms. When indicated by history or physical examination, however, any applicant may be required to submit an ECG under the provisions of FAR 67.31, Medical Records.

II. EXAMINATION PROCEDURES

A. Date

The date of the most recent ECG shall be entered in Item 59 of FAA Form 8500-8 for all first-class applicants.

1. If a second- or third-class applicant gives a history of having had ECG studies, a date may be entered in Item 59 if a specific date is known. More importantly, the Examiner should indicate on the FAA Form 8500-8 the history and its significance, if any.

2. If a first-class applicant is not required to have a periodic ECG with the present examination, the date of the preceding ECG should be recorded in Item 59.

3. If a periodic ECG for a first-class applicant is due, the Examiner obtains a current tracing according to established procedures (see D below), attaches the original to the FAA Form 8500-8, and enters the date of the tracing in Item 59. However, some applicants (such as airline transport pilots who are employed by air carriers with medical departments) may have their company send a current ECG directly to the FAA. The Examiner need not require such an applicant to undergo another ECG examination and if the applicant is otherwise qualified, a medical certificate may be issued. The Examiner should attach a statement to the FAA Form 8500-8 to verify that a tracing has been sent from another source. The date of that ECG should be entered in Item 59.

4. If no statement is provided by the applicant, and he/she refuses to have a current ECG submitted by the Examiner, the Examiner should defer issuance of the medical certificate. When an ECG is due but not submitted, the applicant's eligibility for medical certification will not be affirmed by the FAA until the requested tracing has been received and interpreted as being within normal limits. Failure to respond to FAA requests for a required current ECG will result in denial of certification.

B. Currency

1. In order to meet regulatory requirements, the periodic ECG for a first-class applicant must have been made within 90 days prior to the date of the first-class application (FAA Form 8500-8). Currency of all periodic ECGs is verified by the Aeromedical Certification Branch, AAC-130.

2. There is no provision for issuance of a first-class medical certificate based upon a promise that an electrocardiogram will be obtained at a future date. In such circumstances, the Examiner should defer issuance and mail the completed 8500-8 to the Aeromedical Certification Branch, AAC-130.

C. Interpretation

1. All ECGs required to establish eligibility for medical certification--whether a periodic requirement or not--are to be forwarded for interpretation to the Chief, Aeromedical Certification Branch, Oklahoma City. This does not preclude submission of an interpretation by or through the Examiner, if he/she wishes to do so.

2. Interpretation is accomplished by staff and consultant cardiologists at the Civil Aeromedical Institute in Oklahoma City. Abnormalities are investigated to determine their significance, if any.

D. Technique and Reporting Format

1. See FAA Form 8065-1, Appendix 2, Instructions for Preparation and Submission of Electrocardiogram. This form prescribes the preferred procedures and format. The FAA will, however, also accept 3-channel or 12-channel strips uncut or mounted on standard mounting paper. The following steps are essential to expedient processing of these tracings:

a. All leads must be properly identified.

b. Applicant and Examiner identification must be complete and the tracing dated.

2. ECGs for all first-class applicants are microfilmed for permanent retention in the Aeromedical Certification Branch, AAC-130. Only tracings that can be microfilmed are acceptable. Therefore, Examiners are requested to forward only original ECG tracings to the FAA. Duplicates are not acceptable and will be returned to the Examiner with a request for the originals. Original tracings will be returned to the Examiner or other originator when requested.

3. Tracings must be stapled to the ECG report form to assure that all leads are appropriately coded and interpreted.

III. DISPOSITION

While disposition based upon the ECG is made by the FAA subsequent to interpretation at the Aeromedical Certification Branch, AAC-130, the Examiner should defer or deny any applicant known to have or have had:

A. Arrhythmias, except sinus arrhythmia and occasional atrial or ventricular ectopic beats.

B. Conduction defects such as:

1. Second degree or complete heart block.

2. Left bundle branch block.

3. Right bundle branch block.

4. Wolff-Parkinson-White syndrome, with or without a history of paroxysmal atrial tachycardia.

C. Other significant findings such as unequivocal electrocardiographic evidence of:

1. Myocardial infarction.
2. Coronary heart disease.
3. Ventricular strain.
4. Ventricular hypertrophy.

ITEM 60. Other Tests

60 OTHER TESTS

I. FEDERAL AVIATION REGULATIONS

All Classes: FAR 67.31

***Whenever the Administrator finds that additional medical information or history is necessary to determine whether an applicant for or the holder of a medical certificate meets the medical standards for it, he requests that person to furnish that information or authorize any clinic, hospital, doctor, or other person to release to the Administrator any available information or records concerning that history. If the applicant, or holder, refuses to provide the requested medical information or history or to authorize the release so requested, the Administrator may suspend, modify, or revoke any medical certificate that he holds or may, in the case of an applicant, refuse to issue a medical certificate to him.

II. EXAMINATION PROCEDURES

Additional medical information may be furnished through additional history taking, through further clinical examination procedures, and through supplemental laboratory procedures. On rare occasions even surgical procedures such as biopsies may be indicated

As a designee of the Administrator of the FAA, the Examiner has limited authority to apply FAR 67.31 in processing applications for medical certification. When an Examiner determines that there is a need for additional medical information, based upon history and findings, the Examiner is authorized to request prior hospital and out-patient records and to request supplementary examinations to include laboratory testing and examinations by appropriate medical specialists. The Examiner should discuss the need with the applicant. The applicant should be advised concerning the types of additional examinations required and the type of medical specialist to be consulted. Responsibility for assuring the forwarding of these examinations and for payment of any charges or fees will rest with the applicant. All reports should be forwarded to the Aeromedical Certification Branch, AAC-130, unless otherwise directed (such as by a Regional Flight Surgeon).

Whenever, in the opinion of the Examiner, medical records are necessary to evaluate the medical fitness of the applicant, the Examiner shall request that the applicant sign an authorization for release of medical information (FAA Form 8500-21, see Appendix 2). This authorization will then be forwarded to the custodian of the applicant's records so that the information contained in the record may be obtained for attachment to the report of medical examination.

III. DISPOSITION

A. Refusal by Applicant

When advised by an Examiner that further examination and/or medical records are needed, the applicant may elect not to proceed. The Examiner should note this upon FAA Form 8500-8. No certificate should be issued, and it is important that the Examiner forward the application form to the Aeromedical Certification Branch, AAC-130. This is true even if the application is considered to be incomplete.

B. Anticipated Delay

When the Examiner anticipates a delay of over 14 days in obtaining records or reports concerning additional examinations, the completed FAA Form 8500-8 should be sent to the Aeromedical Certification Branch, AAC-130, with a note stating that additional information will follow. No medical certificate should be issued.

C. Issuance

When the Examiner receives all the supplemental information requested and finds that the applicant fully meets all the FAA medical standards for the class sought, a medical certificate may be issued by the Examiner.

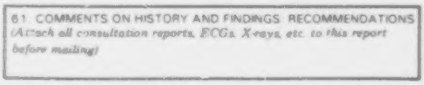
D. Deferral

If upon receipt of the information requested, the Examiner finds there is need for even more information or there is doubt as to the significance of the findings, certification should be deferred, concerns should be noted on the FAA Form 8500-8, and the application should be sent to the Aeromedical Certification Branch, AAC-130, for further consideration. If the applicant decides at this point to abandon the application for a medical certificate (for all classes), the Examiner should also note this on the FAA Form 8500-8 before mailing it to the FAA.

E. Denial

When the Examiner concludes that the applicant is clearly ineligible for certification, the applicant should be denied, using FAA Form 8500-2 (see Appendix 2). Use of this form will provide the applicant with the reason for the denial and with appeal rights and procedures.

ITEM 61. Comments on History and Findings; Recommendations



61. COMMENTS ON HISTORY AND FINDINGS: RECOMMENDATIONS
(Attach all consultation reports, ECGs, X-rays, etc. to this report before mailing)

This item provides the Examiner with an opportunity to report observations and/or findings that are not asked for in other items on the application form. Concern over behavior of the applicant, abnormal situations arising during conduct of tests, unusual findings, unreported history and other information thought germane to aviation safety should be reported under Item 61 or on a separate sheet of paper.

If possible, all ancillary reports such as consultations, ECGs, X-ray release forms, and hospital or other treatment records should be attached. If delay for attachment would exceed 14 days, it is recommended that all available data be forwarded to the Aeromedical Certification Branch, AAC-130, with a note specifying the additional information being prepared for submission at a later date.

ITEM 62. Applicant's Name

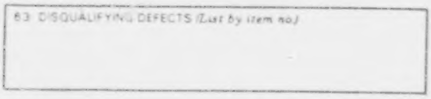
62. APPLICANTS NAME

I. The applicant's name should be typed.

II. The proper box must be checked to indicate if the white Medical Certificate FAA Form 8500-9 or yellow Medical Certificate and Student Pilot Certificate, FAA Form 8420-2 has been issued.

III. If neither form has been issued, deferral or denial must be indicated by a check in one of the two lower boxes. If denied, a copy of Examiner's letter of denial (FAA Form 8500-2) should be attached to the report sent to the Aeromedical Certification Branch, AAC-130.

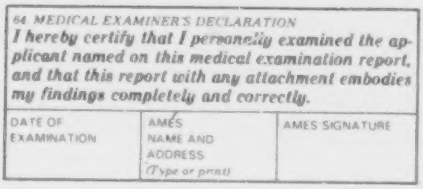
ITEM 63. Disqualifying Defects



63 DISQUALIFYING DEFECTS *(List by item no.)*

Any disqualifying defects, diagnoses, or conditions must be listed by item number. Comments or discussion of specific observations or findings may be reported under Item 61 or submitted on a separate sheet of paper.

ITEM 64. Medical Examiners Declaration



64 MEDICAL EXAMINER'S DECLARATION

I hereby certify that I personally examined the applicant named on this medical examination report, and that this report with any attachment embodies my findings completely and correctly.

DATE OF EXAMINATION	AMES NAME AND ADDRESS *(Type or print)*	AMES SIGNATURE

Date of examination and the Examiner's name and complete address must be typed. The Examiner must personally sign the completed form. The signature authority of the Examiner may not be delegated to any other person, including other physicians. The delegation as an Examiner is made by the FAA to a specific individual and may not be redelegated to a physician who may be covering the practice of the designee.

While the FAA does not require that the Examiner sign the Examiner copy of FAA Form 8500-8, it is recommended that the Examiner at least personally initial this form.

Appendix 1

Federal Aviation Regulations

PART 67

Medical Standards and Certification

Published September 1974

CHANGE 1, effective December 21, 1976
has been incorporated into Part 67.

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Introductory Note

Part 67 is codified under Subchapter D, Airmen, of Title 14 of the CODE OF FEDERAL REGULATIONS.

This FAA publication of the basic Part 67, effective November 1, 1962, incorporates Amendments 67-1 through 67-9 and any changes required by the Department of Transportation transition amendment.

Adoption of Subchapter D

Adopted: August 6, 1962 **Effective: November 1, 1962**

This amendment adds Subchapter D "Airmen" to Chapter I of Title 14 of the Code of Federal Regulations. The amendment is a part of the program of the Federal Aviation Agency to recodify its regulatory material into a new series of regulations called the "Federal Aviation Regulations" to replace the present "Civil Air Regulations" and "Regulations of the Administrator".

During the life of the recodification project, Chapter I of Title 14 may contain more than one Part bearing the same number. To differentiate between the two, the recodified Parts, such as the ones in this subchapter, will be labeled "[New]". The label will of course be dropped at the completion of the project as all of the regulations will be new.

Subchapter D [New] was published as a notice of proposed rule making in the Federal Register on May 2, 1962 (27 F.R. 4175) and as Draft Release 62-20.

Some of the comments received recommended specific substantive changes to the regulations. Although some of the recommendations might, upon further study, appear to be meritorious, they cannot be adopted as a part of the recodification program. The purpose of the program is simply to streamline and clarify present regulatory language and to delete obsolete or redundant provisions. To attempt substantive changes in the recodification of these regulations (other than minor, relaxatory ones that are completely noncontroversial) would delay the project and would be contrary to the ground rules specified for it in the Federal Register on November 15, 1961 (26 F.R. 10698) and Draft Release 62-20. However, all comments of this nature will be preserved and considered in any later substantive revision of the affected Parts.

Certain changes, not contained in Draft Release 62-20, reflect amendments, to the Parts revised herein, that became effective after the Draft Release was published. Each of these amendments, when published, contained a statement that they would be included in the final draft of the recodified Parts affected and, in addition, Draft Release 62-20, stated that such amendments would be included in the final draft of the revised subchapter. See amendments 20-15, 20-16, 20-17, 21-8, 22-13, 22-14, 24-4, and 24-5.

Draft Release 62-14, dated April 2, 1962, proposed certain amendments to provisions of Part 20 of the Civil Air Regulations under which former military pilots may obtain private and commercial pilot certificates on the basis of military competence. The period for receiving comments on the proposal having closed on June 7, 1962, and no adverse comments having been received thereon, these amendments are incorporated into § 61.31 of the revised subchapter.

Other minor changes of a technical clarifying nature or relaxatory nature have been made. They are not substantive and do not impose any burden on regulated persons. For example, the unnecessary provision, contained in CAR 21.23, that an airline transport pilot must present his pilot certificate for inspection by any person, has been deleted in the light of other existing requirements that such a pilot must present his certificate for inspection upon the request of the Administrator, an authorized representative of the CAB, any State or local law enforcement officer, or any passenger.

Draft Release 62-27 dated June 8, 1962 (27 F.R. 5686) contained a notice of the revision of the procedural rules of the Federal Aviation Agency. The preamble to the release stated that the certification procedural rules in Part 406 of the Regulations of the Administrator were being considered for transfer to the Parts to which they specifically applied, insofar as they did not duplicate provisions already in those Parts. For this reason, a new Subpart B, relating to procedures for medical certificates, has been added to Part 67 "Medical Standards and Certification" [New]. The subpart is a revision, without substantive changes, of medical certification provisions now in Part 406.

Of the comments received on Draft Release 62-20, several suggested changes in style, format, or technical wording. These comments have been carefully considered and, where consistent with the style, format, and terminology of the recodification project, were adopted.

The definitions, abbreviations, and rules of construction contained in Part 1 [New] of the Federal Aviation Regulations apply to the new Subchapter D.

Interested persons have been afforded an opportunity to participate in the making of this regulation, and due consideration has been given to all relevant matter presented. The Agency appreciates the cooperative spirit in which the public's comments were submitted.

In consideration of the foregoing Chapter I of Title 14 of the Code of Federal Regulations is amended, effective November 1, 1962, by deleting Parts 20, 21, 22, 24, 25, 26, 27, 29, 34, 35, §§ 43.40–43.42, 43.52–43.63, 43.64(b), (c), and (d), 43.65, 43.68, and Special Regulations 428 and 434, and by adding Subchapter D [New]*, reading as hereinafter set forth.

This amendment is made under the authority of sections 313(a), 314, 601, and 607 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a), 1355, 1421, and 1427).

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*Includes Part 61—Certification: Pilots and Flight Instructors [New]; Part 63—Certification: Flight Crewmembers Other Than Pilots [New]; Part 65—Airmen Other Than Flight Crewmembers [New]; Part 67—Medical Standards and Certification [New].

Amendment 67–1

Cheating on Tests and Other Irregularities

Adopted: February 11, 1965 **Effective: March 20, 1965**

(Published in 30 F.R. 2195 on February 18, 1965)

The purpose of these amendments is to prohibit cheating or certain other unauthorized conduct in connection with FAA written airman or ground instructor tests: fraudulent or intentionally false applications for airman, ground instructor, or medical certificates or ratings, or entries in logbooks, records, or reports required in connection with these certificates or ratings; and alteration, or fraudulent reproduction of these certificates or ratings. This action was proposed in Notice No. 64–20 (29 F.R. 4919) issued April 1, 1964. As proposed, it applies to not only the airman regulations but also the regulations covering medical certification and ground instructors.

A number of comments were received on Notice No. 64–20, most of them generally favorable to the proposed amendments. Three comments opposed as too harsh the provision that the commission of a prohibited act is a basis for suspending or revoking an existing certificate or rating held by the violator. A major purpose for this provision is the deterrent effect of the enunciation of a strong available penalty. Thus, the provision is especially significant with respect to a person who assists another in the violation, for example by taking a test for him. In such a case, it is no deterrent to the former (who usually is obtained because he already holds the certificate the latter is seeking) merely to warn him that the principal penalty for taking a test in behalf of another person is that he will not be eligible, for a year thereafter, for any airman, ground instructor, or medical certificate or rating, as the case may be. The most effective deterrent in this situation would be the possibility of loss of one or all of the certificates he already possesses.

The one-year ineligibility for a certificate or rating is automatic in the case of cheating or other unauthorized conduct in connection with written tests. However, as indicated by Notice No. 64–20, the fact that suspension and revocation of certificates or ratings are made available in these regulations does not mean they must be imposed in every case or automatically upon every violator. The same degree of discretion and the same criteria for the imposition of these sanctions will be exercised by the Agency officials responsible for taking enforcement action in this area as in all other areas where penalties are provided for violation of regulations. Furthermore, the sanctions made available by these amendments do not preclude the imposition, in case of violation, of civil penalties under Section 901 of the Federal Aviation Act of 1958 (49 U.S.C. 1471), either alone or in conjunction with these sanctions.

Comments also were received urging that acts to be prohibited by these amendments should be done "knowingly," or "willfully," or "knowingly or willfully," to incur the sanctions provided. It of course is not the design of these amendments to prohibit acts that might likely be committed inadvertently. Accordingly, these amendments make clear that intention is an element of those prohibited acts that otherwise might likely be committed inadvertently, namely, the removal of a written test, or a false statement on an application for a certificate or rating or in a logbook, record, or required report. Also, responsive to several comments and reflecting the original intention as to reproductions of certificates or ratings, the prohibition has been restated to refer to reproduction for fraudulent purpose. Furthermore, the reference in Notice No. 64–20 to authorization by the Administrator in this connection has been dropped in these amendments, since only fraudulent reproductions are prohibited, and since new documents are issued where appropriate, thus obviating any need for authorizing alterations.

Interested persons have been afforded an opportunity to participate in the making of these amendments, and due consideration has been given to all matter presented.

In consideration of the foregoing, Part 67 of the Federal Aviation Regulations is amended, effective March 20, 1965, as follows.

These amendments are made under the authority of sections, 313(a), 601, 602, and 607 of the Federal Aviation Act of 1958 (49 U.S.C. 1354, 1421, 1422, 1427).

Amendment 67-2

Special Medical Flight or Practical Test or Medical Evaluation for Special Issue of Medical Certificate

Adopted: September 14, 1965 Effective: October 21, 1965

(Published in 30 F.R. 12025, September 21, 1965)

The purpose of these amendments is to make clear that the Federal Air Surgeon has authority (1) to decide whether a special medical flight or practical test, or special medical evaluation, should be conducted or the applicant's operational experience considered under § 67.19 of Part 67 of the Federal Aviation Regulations, and, if so, (2) to prescribe which of these procedures should be used, in the determination of whether a medical certificate should be issued to an applicant who does not meet the applicable medical standards of that Part. This action was proposed in Notice 65–10 (30 F.R. 6188) issued April 23, 1965.

Ten comments were received on Notice 65–10. Six were favorable and three unfavorable to the proposed amendments, and one was nonresponsive. Two of the unfavorable comments expressed concern that the amended rule would vest too much increased authority in the Federal Air Surgeon. The language contained in the proposal merely clarified the provisions of the existing rules and did not vest any increased authority in the Federal Air Surgeon. In this connection, one of these comments also asserted there would be nothing to ensure equal treatment of all applicants with the same defect. It should be noted that the objective of § 67.19 is to provide for the issue of a medical certificate to an applicant who does not meet the medical standards as prescribed in Part 67. In order to achieve that objective in the consideration of the various types of medical deficiencies involved, the Federal Air Surgeon must be given the discretion to conduct the type of test or other procedure that he believes appropriate to determine whether the applicant can properly perform his duties as an airman.

One of these two comments on the proposal further suggested that any rule finally adopted should provide that if the medical defect is static the applicant should be entitled to an opportunity to take a special medical flight-test. If adopted, this not only would make mandatory resort to a special procedure in one type of situation, but it also would prescribe the particular special procedure to be used. As stated in the preamble of Notice 65–10, situations arise in which the Federal Air Surgeon may determine that the applicant could not satisfactorily show, by any of the available special procedures, ability to perform the duties of an airman certificate without endangering safety in air commerce. In such a case, the resort to any of these procedures would not be purposeful, and the Federal Air Surgeon should have authority under § 67.19 to refuse their use. Also as stated in that preamble, where the Federal Air Surgeon does prescribe special medical flight or practical testing or special medical evaluation under § 67.19, the selection of the particular procedure to be used, of those named, essentially is an element of his medical determination whether the applicant can properly perform his duties as an airman despite his physical deficiency. This selection should repose in the Federal Air Surgeon because of his special qualifications and facilities available to him to obtain and assess medical information about an applicant's total medical status. Accordingly, it would defeat the objective of § 67.19 to provide for automatic entitlement to a designated procedure in any particular type of situation.

One of the favorable comments would make mandatory the consideration by the Federal Air Surgeon of an applicant's operational experience under § 67.19. Conversely, another comment expressed the belief that the applicant's operational experience is not germane to the evaluation of an airman's physical qualifications to hold a medical certificate. The medical requirements of the former Part 29 of the CARs were amended, many years ago, to permit an evaluation of the applicant's aeronautical experience regardless of the type of airman certificate or rating sought or held by the applicant. The Agency has pursued this policy as applied by the Federal Air Surgeon, and the last sentence of § 67.19(a)(1) of the proposal expressed the intent of the Agency to continue this policy. To limit the discretionary authority of the Federal Air Surgeon in those cases by prohibiting any consideration by him of the applicant's operational experience, or making such consideration mandatory in all cases, regardless of the type of deficiency involved, would, like the adoption of the suggestion on static defects, also defeat the objective of § 67.19.

Interested persons have been afforded an opportunity to participate in the making of these amendments to § 67.19, and due consideration has been given to all matter presented.

These amendments also substitute the term "Federal Air Surgeon" for the term "Civil Air Surgeon" throughout Part 67, to state the correct current title of this official of the Agency. They also change the numbering of § 67.15(e) to conform with the parallel provisions of §§ 67.13(e) and 67.17(e), in order to preclude the continuation of some current confusion and technical mistakes in referring to these provisions. Since these latter two changes are purely editorial in nature, notice and public procedure thereon are unnecessary.

In consideration of the foregoing, Part 67 of the Federal Aviation Regulations is amended, effective October 21, 1965, as follows.

These amendments are made under the authority of sections 313(a), 314, 601, and 602 of the Federal Aviation Act of 1958 (49 U.S.C. 1354, 1355, 1421, 1422).

Amendment 67–3

Distant Visual Acuity: First- and Second-Class Medical Certificates

Adopted: November 16, 1965 **Effective: November 23, 1965**

(Published in 30 F.R. 14562, November 23, 1965)

The purpose of these amendments is to change the distant visual acuity requirement for an applicant for a first- or second-class medical certificate from at least 20/50 to 20/100 in each eye separately before correction. This action was proposed in Notice 65–22 (30 F.R. 11732) issued September 7, 1965. All comments received on the proposal were favorable.

The present standard in §§ 67.13(b)(1) and 67.15(b)(1) of Part 67 of the Federal Aviation Regulations requires an applicant for a first- or second-class medical certificate, respectively, to have distant visual acuity of at least 20/50 in each eye separately, before correction to 20/20 or better with corrective glasses. As stated in the preamble of Notice 65–22, this standard has been in effect unchanged since 1938, despite later significant technological advances in design and performances of aircraft, and in the environment in which they are operated. Also, as stated in that preamble, applicants with uncorrected distant visual acuity less than specified in the present standard, except those with gross myopic conditions, generally have been allowed to show under § 67.19 whether they have been able to operate aircraft without endangering safety in air commerce despite the disqualification. If they have not had other major disturbances in visual functions, they almost invariably have been able to demonstrate favorably, and they have received special issue of medical certificates on an individual basis. This process has required special detailed evaluations of all aspects of their vision, and has been expensive to applicants, both in money expended for ophthalmological examinations, and in issuance delay time, and it also has entailed considerable time and effort on the part of the Agency.

Accordingly, the accompanying amendments accommodate the distant visual acuity standard for first- and second-class medical certificates to current conditions, and dispense with special testing that in the great majority of cases would result in the special issue of a certificate anyway, without adverse effect upon safety.

Interested persons have been afforded an opportunity to participate in the making of these amendments, and due consideration has been given to all matter presented.

Since these amendments are relaxatory in nature and impose no burden upon any person, good cause exists for making them effective on less than 30 days published notice.

In consideration of the foregoing, Part 67 of the Federal Aviation Regulations is amended, effective November 23, 1965, as follows.

These amendments are made under the authority of section 313(a), 601, and 602 of the Federal Aviation Act of 1958 (49 U.S.C. 1354, 1421, and 1422).

Amendment 67–4

Special Issue of Medical Certificates for Air Traffic Control Tower Operators

Adopted: March 25, 1966 **Effective: March 31, 1966**

(Published in 31 F.R. 5190, March 31, 1966)

The purpose of this amendment is to remove the limitations contained in § 67.19(d) of the Federal Aviation Regulations, relating to special issuance of a medical certificate, so far as those limitations relate to air traffic control tower operators.

Medical certification is now required of all airmen who perform their duties aloft, such as pilots, navigators and flight engineers. Only one class of airmen that perform duties on the ground are required to hold medical certificates—air traffic controllers. Air traffic controllers must hold a second class medical certificate, the same as required of commercial pilots. Private and student pilots, for example, hold only need a third class medical certificate.

Obviously there are great differences in the ground and flight environments in which these different airmen function. A pilot often is alone in the air and must at all times possess not only the technical, but also the physical capacity to act. Even in multi-engine aircraft, where crewmembers perform more specialized duties, the sudden physical incapacity of one can affect the overall crew operation to the extent that aircraft safety is seriously endangered. In general, the air traffic controller is under close supervision with back-up personnel close at hand, capable of performing his functions in the event he is physically disabled. Physical disabilities that may be under the applicable medical standards of Part 67 disqualifying to a flight airman may be tolerated under controlled conditions, in a ground based airman. With these considerations in mind, and with the initiation of the new medical program described below, it is now possible for the Agency to establish a system for issuing waivers, under those controlled conditions, for certain physical defects in ground airmen.

The Federal Aviation Agency has established a health program for applicants and holders of FAA air traffic control specialist field facility positions oriented to the particular job and functional requirements of an air traffic control operator. The program includes the use of diagnostic techniques not required for a second class medical examination under this Part, and provides for professional referrals, consultations, and follow-up examinations as necessary. The program provides that full regard shall be given to the practical requirements of the position. If the employee can be utilized with safety, apparently disqualifying defects or diseases may be waived.

Paragraph 67.19(d) removes from the scope of a special issuance of a medical certificate certain disorders and diseases that are disqualifying without further consideration. In view of the thorough annual examination being required of each FAA air traffic control specialist by the Agency described above, and an evaluation of the physical standards required for air traffic control positions occupied by FAA employees, the Federal Air Surgeon is in a position to determine whether an employee's disease or defect would disqualify him for the position the employee applies for or holds. The comprehensive health program and a more flexible standard for physical disqualification will permit the Agency to utilize trained and experienced employees with no derogation of safety.

There are additionally a group of control tower operators, employed in military or privately operated control towers, who may benefit from the special issuance of medical certificates provided by this amendment. In view of the small number of persons involved, the Federal Air Surgeon can review the special issuance of these control tower operator medical certificates without an undue burden added.

Since this amendment is procedural in nature and results in providing all certificated air traffic control tower operators an additional benefit, notice and public procedure thereon are not required and this amendment may be made effective in less than 30 days after publication.

In consideration of the foregoing, and effective March 31, 1966, section 67.19(d) is amended to read as follows:

This amendment is made under the authority of Sections 307, 313(a) and 602 of the Federal Aviation Act of 1958 (49 U.S.C. 1348, 1354, 1422).

Amendment 67–5

Delegations of Authority to Reconsider Certification Actions; Denials by Representatives of the Federal Air Surgeon Within FAA; and Failure to Furnish Additional Medical Information

Adopted: June 9, 1966 **Effective: July 16, 1966**

(Published in 31 F.R. 8355, June 15, 1966)

The purpose of these amendments to Part 67 of the Federal Aviation Regulations is (1) to provide authorization for certain representatives of the Federal Air Surgeon within the Agency (the Chief, Aeromedical Certification Branch, Civil Aeromedical Institute, and Regional Flight Surgeons) to finally reconsider issuances and denials of medical certificates by aviation medical examiners, in certain situations; (2) to provide that a denial by such a representative in any of those situations is considered to be a denial by the Administrator for the purpose of review by the Civil Aeronautics Board; (3) to require the surrender, upon request, of a medical certificate whose issue is reversed, wholly or in part, upon reconsideration by the Federal Air Surgeon or such a representative; and (4) to state in the regulations that if an applicant for, or holder of, a medical certificate refuses to furnish additional medical information the Administrator may suspend, modify, or revoke a certificate, or refuse to issue it. Except for the scope of the first and second items mentioned, that is now made narrower than originally contemplated, these amendments were proposed in Notice 65–41 issued December 16, 1965 (30 F.R. 16084), for which the comment period was extended to March 23, 1966 by Notice 65–41A issued February 2, 1966 (31 F.R. 1312).

A number of the comments received on Notice 65–41 concurred in the proposals made. One of these comments (as well as several others that did not concur) displayed apprehension that delegation of authority to representatives of the Federal Air Surgeon to "finally reconsider" actions of aviation medical examiners would eliminate an applicant's recourse to petition for exemption from the rules. This apprehension is not well grounded, for Notice 65–41 is not concerned with the exemption procedure in any respect, either explicitly or implicitly. Both the Notice and these amendments are concerned only with the administration of the rules in Part 67, not with the grant or denial of exemptions issued in accordance with rules specifically provided in the rule-making procedures of Part 11.

Some comments presented strong objections to the proposed delegation of authority to representatives of the Federal Air Surgeon within the Agency. One comment concurred in the proposal so far as it would apply to cases where the Federal Air Surgeon does not have authority in any event to consider special issue of medical certificates (cases excluded from § 67.19). It was asserted that the proposed amendments would improperly tend to shift the Federal Air Surgeon's authority to make important decisions in the medical certification area to Regional Flight Surgeons; abrogate the denial authority of the Federal Air Surgeon; and result in a lack of uniformity in the application of medical standards. The first and second assertions display needless apprehension, since the proposals would not affect the general policy making responibility of the Federal Air Surgeon, and the delegation to his representatives would not deprive him of his own authority in the area.

The assertion that a lack of uniformity might result, in the application of medical standards in the certification process, has pointed out an item susceptible of controversy, with strong arguments on each side. As stated in Notice 65–41, the proposal was in keeping with the Agency's policy of decentralization, and would foster a lessening of the delays incident to geographic distances and needless duplication of activity. However, it is recognized that the assertion may have merit, in this highly specialized field of medicine where various individuals may conceivably have different interpretations of a given set of medical facts.

After careful consideration of all issues involved, the Agency has concluded that, in view of this argument against the proposed change, it is doubtful that the action would preserve the maintenance of uniformity in the application of medical standards, and its adoption in full is inappropriate at this time. Therefore, the Agency has dropped this proposed change so far as it pertains to cases in which the Federal Air Surgeon has authority under Part 67 to override a denial of a medical certificate. However, in certain areas listed in § 67.19(d), the regulations do not allow the Federal Air Surgeon to issue medical certificates specially to applicants with established inability to meet the applicable medical standards. In these areas the Federal Air Surgeon has no alternative but to confirm the denial action of his representatives, although he of course provides guide-lines to aviation medical examiners for the application of the medical standards in all cases. The areas involve established medical history or clinical diagnosis of: (1) myocardial infarction, or angina pectoris or other evidence of coronary heart disease that the Federal Air Surgeon finds may reasonably be expected to lead to myocardial infarction; (2) a character or behavior disorder that is severe enough to have repeatedly manifested itself by overt acts, a psychotic disorder, chronic alcoholism, drug addiction, epilepsy, or a disturbance of consciousness without satisfactory medical explanation of the cause; and (3) diabetes mellitus that requires insulin or any other hypoglycemic drug for control. In 1964, approximately 919 and in 1965 approximately 962 cases were referred to the Federal Air Surgeon for further review. Of these, 350 cases in 1964 and 316 cases in 1965, or about one-third of all of the cases so referred, involved denials of medical certificates in the areas described, and the Federal Air Surgeon routinely affirmed the denials, as required. The delegation of final Agency denial authority to representatives in these cases will spare the applicants, as well as the government, great expense and useless effort. These amendments therefore adopt the proposal made in Notice 65–41, to the extent indicated, and as a result greater and faster service will be provided to applicants. After an opportunity to evaluate operational experience under this limited delegation of authority, the Administrator may later delegate full authority to his representative at the Aeromedical Certification Branch, Oklahoma City, to finally reconsider all issuances and denials of medical certificates by aviation medical examiners.

It should be noted, in connection with this limited delegation of authority, that the Federal Air Surgeon and his representatives within the Agency not only retain authority to finally reconsider denials of medical certificates except in the situations listed above, but also have authority upon their own initiative to reconsider issuances of medical certificates by aviation medical examiners. In this manner, cases involving novel or important features may be inquired into by the highest medical authority of the Agency, even where certificates have been issued, as contemplated by subsection 314(b) of the Federal Aviation Act of 1958.

One comment asserted that any attempt by the Agency to reverse the issue of a medical certificate by an aviation medical examiner, without compliance with section 609 of the Federal Aviation Act of 1958, would be invalid, as well as undesirable. Several other comments also pointed out that the burden of proof is the Administrator's under section 609, whereas this burden is the applicant's under section 602 of the Act. Subsection 314(b) of the Act empowers the Administrator to "reconsider" either the denial or issuance of a medical certificate by an aviation medical examiner. It is the Agency's position that when the Administrator exercises that power to correct an error committed by a private person in the exercise of delegated authority (where the aviation medical examiner should have taken a different course of action based upon the information available to him when he issued the medical certificate) the airman must rely upon his rights under section 602 of the Act if he is dissatisfied. In such a case, a "reexamination" under section 609 of the Act is not necessary. The position of the Agency is clarified in these amendments by adding a provision in § 67.25(b) that any action taken by the Federal Air Surgeon or his authorized representative within the Agency under subsection 314(b) of the Act that reverses, wholly or in part, the issue of a medical certificate by an aviation medical examiner is the denial of a certificate by the Administrator under section 602 of the Act.

The proposal to require surrender, upon request, of a medical certificate whose issue is reversed or otherwise changed, upon reconsideration, was generally supported by the comments received. Two comments expressed concern that this would permit arbitrary deprival of a certificate legally issued. However, as stated in Notice 65–41, the obligation is imposed with respect to a certificate that has been found to have been issued to an applicant who in fact does not meet the applicable standards, and the Agency considers this a reasonable requirement in order to protect against the use of the certificate.

In each of these reconsideration provisions, the action taken by the Federal Air Surgeon or his representative within the Agency is described as one to "wholly or partly reverse" the issue of the medical certificate. This language is used in order to make clear that the provisions concern action taken that is adverse to the applicant. It would be clearly unreasonable to provide that action taken upon reconsideration that is advantageous to the applicant is the denial of a medical certificate.

Most of the comments received were not opposed to the proposal to require the applicant or certificate holder to furnish additional medical information. Some comments asserted this authority could be exercised improperly to delve into irrelevant matters. However, as is plain from the provision, the purpose is to obtain additional medical information needed to determine whether an applicant is eligible to hold a medical certificate.

Interested persons have been afforded an opportunity to participate in the making of these amendments, and due consideration has been given to all relevant matter presented.

In consideration of the foregoing, and for the reasons stated in Notice 65-41, Part 67 of the Federal Aviation Regulations is amended effective July 16, 1966.

These amendments are made under the authority of sections 303(d), 313(a), 314(b), 601, 602, and 609 of the Federal Aviation Act of 1958 (49 U.S.C. 1344, 1354, 1355(b), 1421, 1422, 1429).

Amendment 67-6

Special Issue of Medical Certificates by Chief, Aeromedical Certification Branch, and Regional Flight Surgeons

Adopted: June 17, 1968 **Effective: June 22, 1968**

(Published in 33 F.R. 9253, June 22, 1968)

The purpose of this amendment to Part 67 of the Federal Aviation Regulations is to disclose for the guidance of the public the officials making the determinations required under § 67.19 for the issue of a medical certificate to an applicant who does not meet the applicable medical standards.

Section 67.19 provides for the issue of a medical certificate of the appropriate class to an applicant who does not meet the medical standards of Part 67 (other than certain specified requirements). Under the provisions of that section the Federal Air Surgeon determines whether special medical testing or evaluation should be conducted to issue a medical certificate with appropriate limitations to an applicant. This amendment shows that the Chief, Aeromedical Certification Branch, Civil Aeromedical Institute, and Regional Flight Surgeons will now have the same authority.

Since this amendment is procedural in nature, notice and public procedure thereon are not required and it may be made effective in less than 30 days after publication.

In consideration of the foregoing, § 67.19 of the Federal Aviation Regulations is amended, effective June 22, 1968, by inserting a new paragraph (e).

This amendment is made under the authority of sections 303(d), 313(a), 601, and 602 of the Federal Aviation Act of 1958 (49 U.S.C. 1344, 1354, 1421, 1422).

Amendment 67-7

Reconsideration of Certification Actions

Adopted: January 2, 1969 **Effective: February 8, 1969**

(Published in 34 F.R. 248, January 8, 1969)

The purpose of this amendment to Part 67 of the Federal Aviation Regulations is to provide that certain FAA officials may on their own initiative reverse the issuance of a medical certificate by an aviation medical examiner, within 60 days after receiving additional medical information establishing the noneligibility of the holder of that certificate, when that information was requested within 60 days of issuance.

This amendment was proposed in Notice 68-14, and published in the Federal Register on July 10, 1968 (33 F.R. 9005).

Four public comments were received on the Notice, three of which concurred in the proposal or offered no objections. One comment objected to the proposal, asserting that it would be unfair to keep the airman in a state of suspense for any longer period of time because of FAA "inefficiencies". However, this comment failed to recognize that in many cases the need for more time stems from delays of the airman in providing needed medical information to establish his eligibility or noneligibility for a medical certificate. As stated in the Notice, §67.25(b), as amended by Amendment 67-5, effective July 16, 1966, contains a 60-day time limitation within which FAA officials may reconsider and reverse the issuance of a medical certificate by an aviation medical examiner. However, although the reconsideration may indicate the need for additional medical information to determine whether an error was made by an aviation medical examiner, the authority of the FAA official to fully reconsider the case and reverse the issuance of the certificate, if necessary, could be effectively defeated by the failure (or delay) of the holder of the medical certificate to respond to the request for additional medical information within 60 days from the date the certificate was issued. This could allow operation of aircraft by airmen whose physical qualifications have not been fully determined, and, if necessary, require resort to action under section 609 of the Federal Aviation Act to prevent the airman from further operation of an aircraft until a determination can be made that he can do so safely.

Since the term "medical information" as used in §67.31—Medical Records (under which information is requested) includes the results of "medical testing", the latter term is not used in the amended rule although it was used in the Notice. Also, the amendatory language has been rearranged for the purpose of clarification, but without change in meaning.

In consideration of the foregoing, the third sentence of paragraph (b) of §67.25 of the Federal Aviation Regulations is stricken out, and two new sentences are inserted in place thereof, effective February 8, 1969.

This amendment is issued under the authority of sections 303(d), 313(a), 601, and 602 of the Federal Aviation Act of 1958 (49 U.S.C. 1344, 1354(a), 1421, 1422) and of section 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).

Amendment 67-8

Changes in References to FAA Regulations, Position Title, and Certain Addresses

Adopted: August 27, 1970 **Effective: September 4, 1970**

(Published in 35 F.R. 14074, September 4, 1970)

The purpose of these amendments to Parts 61, 63, 65, 67, 141, and 143 of the Federal Aviation Regulations is to reflect in Parts 65 and 141 appropriate references to Part 430 of the Regulations of the National Transportation Safety Board; reflect in Part 67 an organizational change in the title of the FAA Assistant Administrator to FAA Regional Director; and update several references in the Regulations to the addresses to which applications for replacement of lost or destroyed certificates and certain other communications with the FAA are sent. These amendments also correct an inadvertent error made in a recent amendment to Part 65.

On April 1, 1967, the aviation safety functions of the Civil Aeronautics Board under Titles VI and VII of the Federal Aviation Act of 1958 were transferred to the National Transportation Safety Board (49 U.S.C. 1651 et seq.). Thereafter the Board issued Part 430 of its Regulations pertaining to aircraft accidents, incidents, overdue aircraft, and safety investigations, effective November 10, 1969 (34 F.R. 15749). These amendments accordingly change the references in Parts 65 and 141 to Part 430 of the Regulations of the National Transportation Safety Board instead of to Part 320 of the Regulations of the Civil Aeronautics Board.

The organizational title of FAA Assistant Administrator has been changed to FAA Regional Director, and this change is reflected in the amendments to Part 67.

The addition of "Department of Transportation" and box numbers and zip codes to addresses found in Parts 61, 63, 65, 67, and 143 serve to clarify and modernize mailing addresses to which applications for lost or destroyed certificates and certain other communications with the FAA are sent.

In Notice 70-12 (35 F.R. 4862) it was proposed that an air traffic control operator should not be authorized to issue air traffic control clearances for IFR flight without authorization from the appropriate air route traffic control center. In issuing Amendment 65-15 pursuant thereto (35 F.R. 12326) it was stated that a tower may be under the jurisdiction of some facility other than an air route traffic control center, and that therefore the general phrase of reference "facility exercising IFR control" would be used. However, in the amended § 65.45(b) the phrase "air traffic control" was inadvertently used instead of "IFR control." These amendments correct that inadvertence by replacing "air traffic control" with "IFR control."

Notice and public procedure hereon are not required since these amendments merely reflect changes of law and procedures as well as the correction of an inadvertent clerical error, and they may therefore be made effective in less than 30 days.

In consideration of the foregoing, Parts 61, 63, 65, 67, 141 and 143 of the Federal Aviation Regulations are amended, effective September 4, 1970.

(Sections 313(a), 602, 608 of the Federal Aviation Act of 1958: 49 U.S.C. 1354(a), 1422, 1428. Section 6(c) of the Department of Transportation Act: 49 U.S.C. 1655(c)).

NOTE: Corrections to position title in Section 67.23(a) and (b) are incorporated in the original printing of this basic volume.

Amendment 67-9

Revised Terminology and Separation of Disqualifying Mental and Neurologic Conditions

Adopted: February 14, 1972 **Effective: April 26, 1972**

(Published in 37 F.R. 4071, February 26, 1972)

The purpose of these amendments to Part 67 of the Federal Aviation Regulations is (1) to revise the terminology used to denote mental and neurologic conditions that disqualify applicants for medical certificates, to conform with current usage in the medical profession: and (2) to separate what have been termed "nervous system" conditions into mental and neurologic disorders as two distinct groups of disqualifying conditions.

Interested persons have been afforded an opportunity to participate in the making of these amendments by a notice of proposed rule making (Notice 71-30) issued on September 28, 1971, and published in the Federal Register on October 5, 1971 (36 F.R. 19396). Due consideration has been given to all comments presented in response to that Notice.

Two public comments were received in response to the Notice. Each was from an aviation trade association, and each concurred in the proposed amendments.

As stated in the Notice, a disparity has existed between the terminology used in the standards involving mental disorders and currently accepted psychiatric terminology. As a result, difficulty has existed in applying the latter terminology to these mental disabilities although the basic definitions have remained essentially unchanged. To avoid the recurrence of these difficulties, particularly in enforcement actions, and to update the regulations, these amendments revise the terminology describing the mental requirements, as proposed in the Notice, to conform with the terminology generally used by specialists in that branch of medicine as contained in the Manual published by the American Psychiatric Association, "Diagnostic and Statistical Manual of Mental Disorders (second edition 1968)." It is intended that use of that terminology will reduce confusion and ambiguity in the use and application of psychiatric terms by enumerating and defining disqualifying mental disorders in conformity with the terminology used in the current practice of psychiatry.

The proposed changes were reviewed and approved by a committee of the American Psychiatric Association, and that committee indicated that the changes may be considered essentially semantic.

Additionally, as proposed, these amendments separate "mental condition" and "neurologic condition" under the appropriate sections of Part 67 to clarify the applicable standards, as well as to recognize a division in professional specialization in disorders of a mental or neurologic nature. It is anticipated that this separation will also facilitate the gathering and analysis of statistical information relating to airman applicants who have been issued or denied medical certificates where mental or neurologic histories or conditions are concerned. As the neurologic terminology previously used in acceptable, no change is made in the enumeration of disqualifying neurologic disorders.

In consideration of the foregoing, Part 67 of the Federal Aviation Regulations is amended, effective April 26, 1972.

(Sections 313(a), 601, and 602 of the Federal Aviation Act of 1958; 49 U.S.C. 1354(a), 1421, 1422. Section 6(c) of the Department of Transportation Act; 49 U.S.C. 1655(c)).

Amendment 67–10

Visual Acuity Requirements for Medical Certificates; Use of Contact Lenses

Adopted: October 12, 1976 Effective: December 21, 1976

(Published in 41 F.R. 46432, October 21, 1976)

The purpose of this amendment to Part 67 of the Federal Aviation Regulations is to permit the use of contact lenses (as well as eye glasses) to satisfy the distant visual acuity requirement of Part 67.

Interested persons have been afforded an opportunity to participate in the making of this amendment by a Notice of Proposed Rulemaking (Notice No. 75-33) issued on September 2, 1975, and published in the Federal Register on September 10, 1975, (40 F.R. 42024). Due consideration has been given to all comments received in response to that Notice.

Notice No. 75-33 was issued in response to a petition for rulemaking submitted by the Aircraft Owners and Pilots Association (AOPA) by letter dated March 8, 1974. AOPA petitioned for amendment of the medical standards of Part 67, specifically to authorize the use of contact lenses for meeting visual requirements for all classes of airman medical certificates. In support of its petition, AOPA contented that experience shows that the use of contact lenses produces no sudden unpredictable hazards to flight, and that once in place, a contact lens is not easily dislodged. AOPA also pointed out that in some situations contact lenses are superior to glasses because they do not obstruct the peripheral visual field as do spectacle frames, and further that contact-lens use is more compatible with the wearing of certain protective equipment.

The FAA has recognized the increasing popularity and use of contact lenses in the United States, and certain advantages of these lenses over spectacles. While the medical standards of Part 67 of the Federal Aviation Regulations specifically provide that acceptable vision correction shall be achieved through the use of glasses, Statements of Demonstrated Ability (special issuances) have been issued to applicants pursuant to § 67.19 of the Federal Aviation Regulations, permitting the use of contact lenses to correct distant visual acuity. Contact lenses that correct near visual acuity have not been considered acceptable for aviation duties. To date, these special issuances have been granted only upon submission of detailed reports by eye specialists and after review of these reports by FAA medical personnel. This administrative procedure has frequently delayed the initial medical certification of applicants who wish to wear contact lenses to meet distant visual acuity standards.

As pointed out in Notice 75-33, FAA experience indicates that, these evaluation reports have had limited value in uncovering significant pathology or evidence of complications that would contraindicate the use of contact lenses in the performance of aviation duties. In addition, the agency is unaware of any accidents or incidents in which the use of contact lenses by airmen was a contributing factor.

One hundred thirty-seven comments were received in response to this proposal. Most of the comments received were favorable, five expressed no opinion, and one opposed the proposed amendment. The comment in opposition to the proposal stated that the possibility of dislodgement of lenses might adversely affect safety.

Several commentators suggested that contact lens wearers be required to carry "backup" glasses to replace their contact lenses in the event the lenses are dislodged during operation of an aircraft.

In developing Notice No. 75-33 the FAA considered requiring contact lens wearers to carry an extra pair of contact lenses or glasses while performing airman duties. The FAA concluded, however, that the likelihood of losing one or both lenses during flight was not of sufficient magnitude to warrant such a requirement. Moreover, it was noted that should an individual lose one lens and attempt to improve vision with "backup" glasses, he would most likely have to remove the remaining lens and that under any circumstances, corneal molding from the lens would not permit full interchange of lenses and glasses. Furthermore, if a lens was lost during a critical phase of flight, there would be no opportunity to replace the lens with a "backup" contact lens and the airman might be better off under those circumstances with only one lens in place.

The FAA has determined that the question of whether the airman should routinely carry a spare set of lenses (contact lenses or glasses), may be left to the individual without adversely affecting aviation safety. It should be noted that present regulations do not require "backup" glasses when glasses are needed to meet the visual acuity standards, even though glasses may be misplaced or dropped, just as with contact lenses. There has been no indication that the absence of such a requirement has in any way compromised safety.

Additionally, several commentators stated that effects of corneal molding from wearing contact lenses may create difficulties in assessing an applicant's uncorrected distant visual acuity at the time of examination. The commentators pointed out that such circumstances could interfere with the appropriate application of existing visual acuity standards that require applicants for first- and second-class medical certificates to have distant visual acuity of at least 20/100 in each eye separately, without correction.

The FAA believes that this potential problem does not require regulatory action at this time. Designated Aviation Medical Examiners will be provided guidelines for the evaluation and testing of applicants who wear contact lenses.

An applicant whose uncorrected visual acuity is substantially affected by recent use of contact lenses will be advised not to wear the lenses for a period of time and then will be re-examined.

The FAA believes that the use of contact lenses to correct distant visual acuity will not adversely affect safety, and that the administrative delay experienced by applicants in obtaining special issuances under § 67.19 will be avoided by amending Part 67 to permit the use of contact lenses as well as eye glasses.

These amendments are made under the authority of sections 313(a), 601 and 602 of the Federal Aviation Act of 1958 (49 U.S.C. 1354, 1421, and 1422) and section 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).

In consideration of the foregoing, §§ 67.13(b)(1), 67.15(b)(1) and 67.17(b)(1) of Part 67 of the Federal Aviation Regulations are amended effective December 21, 1976.

Part 67—Medical Standards and Certification

Subpart A—General

§ 67.1 Applicability.

This subpart prescribes the medical standards for issuing medical certificates for airmen.

§ 67.11 Issue.

An applicant who meets the medical standards prescribed in this Part, based on medical examination and evaluation of his history and condition is entitled to an appropriate medical certificate.

§ 67.13 First-class medical certificate.

(a) To be eligible for a first-class medical certificate, an applicant must meet the requirements of paragraphs (b) through (f) of this section.

[(b) *Eye:*

[(1) Distant visual acuity of 20/20 or better in each eye separately, without correction; or of at least 20/100 in each eye separately corrected to 20/20 or better with corrective lenses (glasses or contact lenses) in which case the applicant may be qualified only on the condition that he wears those corrective lenses while exercising the privileges of his airman certificate.]

(2) Near vision of at least v=1.00 at 18 inches with each eye separately, with or without corrective glasses.

(3) Normal color vision.

(4) Normal fields of vision.

(5) No acute or chronic pathological condition of either eye or adenexae that might interfere with its proper function, might progress to that degree, or might be aggravated by flying.

(6) Bifoveal fixation and vergencephoria relationship sufficient to prevent a break in fusion under conditions that may reasonably occur in performing airman duties.

Tests for the factors named in subparagraph (6) of this paragraph are not required except for applicants found to have more than one prism diopter of hyperphoria, six prism diopters of esophoria, or six prism diopters of exophoria. If these values are exceeded, the Federal Air Surgeon may require the applicant to be examined by a qualified eye specialist to determine if there is bifoveal fixation and adequate vergencephoria relationship. However, if the applicant is otherwise qualified, he is entitled to a medical certificate pending the results of the examination.

(c) *Ear, nose, throat, and equilibrium:*

(1) Ability to—

(i) Hear the whispered voice at a distance of at least 20 feet with each ear separately: or

(ii) Demonstrate a hearing acuity of at least 50 percent of normal in each ear throughout the effective speech and radio range as shown by a standard audiometer.

(2) No acute or chronic disease of the middle or internal ear.

(3) No disease of the mastoid.

(4) No unhealed (unclosed) perforation of the eardrum.

(5) No disease or malformation of the nose or throat that might interfere with, or be aggravated by, flying.

(6) No disturbance in equilibrium.

(d) *Mental and neurologic:*

(1) Mental.

(i) No established medical history or clinical diagnosis of any of the following:

(a) A personality disorder that is severe enough to have repeatedly manifested itself by overt acts.

(b) A psychosis.

(c) Alcoholism. As used in this section, "alcoholism" means a condition in which a person's intake of alcohol is great enough to damage his physical health or personal or social functioning, or when alcohol has become a prerequisite to his normal functioning.

(d) Drug dependence. As used in this section, "drug dependence" means a condition in which a person is addicted to or dependent on drugs other than alcohol, tobacco, or ordinary caffeine-containing beverages, as evidenced by habitual use or a clear sense of need for the drug.

(ii) No other personality disorder, neurosis, or mental condition that the Federal Air Surgeon finds—

(a) Makes the applicant unable to safely perform the duties or exercise the privileges of the airman certificate that he holds or for which he is applying; or

(b) May reasonably be expected, within two years after the finding, to make him unable to perform those duties or exercise those privileges;

and the findings are based on the case history and appropriate, qualified, medical judgment relating to the condition involved.

(2) Neurologic.

(i) No established medical history or clinical diagnosis of either of the following:

(a) Epilepsy.

(b) A disturbance of consciousness without satisfactory medical explanation of the cause.

(ii) No other convulsive disorder, disturbance of consciousness, or neurologic condition that the Federal Air Surgeon finds—

(a) Makes the applicant unable to safely perform the duties or exercise the privileges of the airman certificate that he holds or for which he is applying; or

(b) May reasonably be expected, within two years after the finding, to make him unable to perform those duties or exercise those privileges;

and the findings are based on the case history and appropriate, qualified, medical judgment relating to the condition involved.

(e) *Cardiovascular:*

(1) No established medical history or clinical diagnosis of—

(i) Myocardial infarction; or

(ii) Angina pectoris or other evidence of coronary heart disease that the Federal Air Surgeon finds may reasonably be expected to lead to myocardial infarction.

(2) If the applicant has passed his thirty-fifth birthday but not his fortieth, he must, on the first examination after his thirty-fifth birthday, show an absence of myocardial infarction on electrocardiographic examination.

(3) If the applicant has passed his fortieth birthday, he must annually show an absence of myocardial infarction on electrocardiographic examination.

(4) Unless the adjusted maximum readings apply, the applicant's reclining blood pressure may not be more than the maximum reading for his age group in the following table:

Age Group	Maximum readings (reclining blood pressure in mm)		Adjusted maximum readings (reclining blood pressure in mm)[1]	
	Systolic	Diastolic	Systolic	Diastolic
20-29	140	88	—	—
30-39	145	92	155	98
40-49	155	96	165	100
50 and over	160	98	170	100

[1] For an applicant at least 30 years of age whose reclining blood pressure is more than the maximum reading for his age group and whose cardiac and kidney conditions, after complete cardiovascular examination, are found to be normal.

(5) If the applicant is at least 40 years of age, he must show a degree of circulatory efficiency that is compatible with the safe operation of aircraft at high altitudes.

An electrocardiogram, made according to acceptable standards and techniques within the 90 days before an examination for a first-class certificate, is accepted at the time of the physical examination as meeting the requirements of subparagraphs (2) and (3) of this paragraph.

(f) *General medical condition:*

(1) No established medical history or clinical diagnosis of diabetes mellitus that requires insulin or any other hypoglycemic drug for control.

(2) No other organic, functional, or structural disease, defect, or limitation that the Federal Air Surgeon finds—

(i) Makes the applicant unable to safely perform the duties or exercise the privileges of the airman certificate that he holds or for which he is applying; or

(ii) May reasonably be expected, within two years after the finding, to make him unable to perform those duties or exercise those privileges;

and the findings are based on the case history and appropriate, qualified, medical judgment relating to the condition involved.

§ 67.15 Second-class medical certificate.

(a) To be eligible for a second-class medical certificate, an applicant must meet the requirements of paragraphs (b) through (f) of this section.

[(b) *Eye:*

[(1) Distant visual acuity of 20/20 or better in each eye separately, without correction: or of at least 20/100 in each eye separately corrected to 20/20 or better with corrective lenses (glasses or contact lenses), in which case the applicant may be qualified only on the condition that he wears those corrective lenses while exercising the privileges of his airman certificate.]

(2) Enough accommodation to pass a test prescribed by the Administrator based primarily on ability to read official aeronautical maps.

(3) Normal fields of vision.

(4) No pathology of the eye.

(5) Ability to distinguish aviation signal red, aviation signal green, and white.

(6) Bifoveal fixation and vergencephoria relationship sufficient to prevent a break in fusion under conditions that may reasonably occur in performing airman duties.

Tests for the factors named in subparagraph (6) of this paragraph are not required except for applicants found to have more than one prism diopter of hyperphoria, six prism diopters of esophoria, or six prism diopters of exophoria. If these values are exceeded, the Federal Air Surgeon may require the applicant to be examined by a qualified eye specialist to determine if there is bifoveal fixation and adequate vergencephoria relationship. However, if the applicant is otherwise qualified, he is entitled to a medical certificate pending the results of the examination.

(c) *Ear, nose, throat, and equilibrium:*

(1) Ability to hear the whispered voice at 8 feet with each ear separately.

(2) No acute or chronic disease of the middle or internal ear.

(3) No disease of the mastoid.

(4) No unhealed (unclosed) perforation of the eardrum.

(5) No disease or malformation of the nose or throat that might interfere with, or be aggrevated by, flying.

(6) No disturbance in equilibrium.

(d) *Mental and neurologic:*

(1) Mental.

(i) No established medical history or clinical diagnosis of any of the following:

(a) A personality disorder that is severe enough to have repeatedly manifested itself by overt acts.

(b) A psychosis.

(c) Alcoholism. As used in this section, "alcoholism" means a condition in which a person's intake of alcohol is great enough to damage his physical health or personal or social functioning, or when alcohol has become a prerequisite to his normal functioning.

(d) Drug dependence. As used in this section, "drug dependence" means a condition in which a person is addicted to or dependent on drugs other than alcohol, tobacco, or ordinary caffeine-containing beverages, as evidenced by habitual use or a clear sense of need for the drug.

(ii) No other personality disorder, neurosis, or mental condition that the Federal Air Surgeon finds—

(a) Makes the applicant unable to safely perform the duties or exercise the privileges of the airman certificate that he holds or for which he is applying: or

(b) May reasonably be expected, within two years after the finding, to make him unable to perform those duties or exercise those privileges;

and the findings are based on the case history and appropriate, qualified, medical judgment relating to the condition involved.

(2) Neurologic.

(i) No established medical history or clinical diagnosis of either of the following:

(a) Epilepsy.

(b) A disturbance of consciousness without satisfactory medical explanation of the cause.

(ii) No other convulsive disorder, disturbance of consciousness, or neurologic condition that the Federal Air Surgeon finds—

(a) Makes the applicant unable to safely perform the duties or exercise the privileges of the airman certificate that he holds or for which he is applying: or

(b) May reasonably be expected, within two years after the finding, to make him unable to perform those duties or exercise those privileges;

and the findings are based on the case history and appropriate, qualified, medical judgment relating to the condition involved.

(e) *Cardiovascular:*

(1) No established medical history or clinical diagnosis of—

(i) Myocardial infarction: or

(ii) Angina pectoris or other evidence of coronary heart disease that the Federal Air Surgeon finds may reasonably be expected to lead to myocardial infarction.

(f) *General medical condition:*

(1) No established medical history or clinical diagnosis of diabetes mellitus that requires insulin or any other hypoglycemic drug for control.

(2) No other organic, functional, or structural disease, defect, or limitation that the Federal Air Surgeon finds—

(i) Makes the applicant unable to safely perform the duties or exercise the privileges of the airman certificate that he holds or for which he is applying: or

(ii) May reasonably be expected, within 2 years after the finding to make him unable to perform those duties or exercise those privileges:

and the findings are based on the case history and appropriate, qualified, medical judgment relating to the condition involved.

§ 67.17 Third-class medical certificate.

(a) To be eligible for a third-class medical certificate, an applicant must meet the requirements of paragraphs (b) through (f) of this section.

[(b) *Eye:*

[(1) Distant visual acuity of 20/50 or better in each eye separately, without correction; or if the vision in either or both eyes is poorer than 20/50 and is corrected to 20/30 or better in each eye with corrective lenses (glasses or contact lenses), the applicant may be qualified on the condition that he wears those corrective lenses while exercising the privileges of his airman certificate.]

(2) No serious patholoy of the eye.

(3) Ability to distinguish aviation signal red, aviation signal green, and white.

(c) *Ears, nose, throat, and equilibrium:*

(1) Ability to hear the whispered voice at 3 feet.

(2) No acute or chronic disease of the internal ear.

(3) No disease or malformation of the nose or throat that might interfere with, or be aggravated by, flying.

(4) No disturbance in equilibrium.

(d) *Mental and neurologic:*

(1) Mental.

(i) No established medical history or clinical diagnosis of any of the following:

(a) A personality disorder that is severe enough to have repeatedly manifested itself by overt acts.

(b) A psychosis.

(c) Alcoholism. As used in this section, "alcoholism" means a condition in which a person's intake of alcohol is great enough to damage his physical health or personal or social functioning, or when alcohol has become a prerequisite to his normal functioning.

(d) Drug dependence. As used in this section, "drug dependence" means a condition in which a person is addicted to or dependent on drugs other than alcohol, tobacco, or ordinary caffeine-containing beverages, as evidenced by habitual use or a clear sense of need for the drug.

(ii) No other personality disorder. neurosis, or mental condition that the Federal Air Surgeon finds—

(a) Makes the applicant unable to safely perform the duties or exercise the privileges of the airman certificate that he holds or for which he is applying; or

(b) May reasonably be expected, within two years after the finding, to make him unable to perform those duties or exercise those privileges;

and the findings are based on the case history and appropriate, qualified, medical judgment relating to the condition involved.

(2) Neurologic.

(i) No established medical history or clinical diagnosis of either of the following:

(a) Epilepsy.

(b) A disturbance of consciousness without satisfactory medical explanation of the cause.

(ii) No other convulsive disorder, disturbance of consciousness, or neurologic condition that the Federal Air Surgeon finds—

(a) Makes the applicant unable to safely perform the duties or exercise the privileges of the airman certificate that he holds or for which he is applying; or

(b) May reasonably be expected, within two years after the finding, to make him unable to perform those duties or exercise those privileges;

and the findings are based on the case history and appropriate. qualified, medical judgment relating to the condition involved.

(e) *Cardiovascular:*

(1) No established medical history or clinical diagnosis of—

(i) Myocardial infraction; or

(ii) Angina pectoris or other evidence of coronary heart disease that the Federal Air Surgeon finds may reasonably be expected to lead to myocardial infarction.

(f) *General medical condition:*

(1) No established medical history or clinical diagnosis of diabetes mellitus that requires insulin or any other hypoglycemic drug for control;

(2) No other organic, functional or structural disease, defect, or limitation that the Federal Air Surgeon finds—

(i) Makes the applicant unable to safely perform the duties or exercise the privileges of the airman certificate that he holds or for which he is applying; or

(ii) May reasonably be expected, within 2 years after the finding, to make him unable to perform those duties or exercise those privileges;

and the findings are based on the case history and appropriate, qualified, medical judgment relating to the condition involved.

§ 67.19 Special issue: operational limitations.

(a) A medical certificate of the appropriate class may be issued to an applicant who does not meet the medical standards of this Part, under the following procedures:

(1) The Federal Air Surgeon may in his discretion find that a special medical flight or practical test, or special medical evaluation, should be conducted to determine whether the applicant can perform his duties under the airman certificate he holds, or for which he is applying, in a manner that will not endanger safety in air commerce during the period the certificate would be in force. Upon such a finding, the Federal Air Surgeon authorizes the conduct of that test or evaluation. The Federal Air Surgeon may also consider the applicant's operational experience for this purpose.

(2) If the Federal Air Surgeon authorizes a procedure under subparagraph (1) of this paragraph, the applicant must show to the satisfaction of the Federal Air Surgeon, by the prescribed procedure, that he can perform those duties in the manner referred to in subparagraph (1). Upon such a showing, the Federal Air Surgeon issues to the applicant a medical certificate of the appropriate class.

(b) Any operational limitation on, or limit on the duration of, a certificate issued under this section that the Federal Air Surgeon determines is needed for safety shall be specified on the airman or medical certificate held by, or issued to, the applicant.

(c) An applicant who has taken a practical or flight test for a medical certificate under this section, and who has had a medical certificate issued to him under this section as a result of that test, need not take the test again during later physical examinations unless the Federal Air Surgeon determines that his physical deficiency has become enough more pronounced to require such an additional test.

(d) Except for air traffic control tower operators, this section does not apply to an applicant who fails to meet the requirements of §§67.13(d)(1)(i), (d)(2)(i), (e)(1), or (f)(1), 67.15(d)(1)(i), (d)(2)(i), (e), or (f)(1), or 67.17(d)(1)(i), (d)(2)(i), (e), or (f)(1). A medical certificate issued to an air traffic control tower operator who does not meet the requirements of any of those sections is valid only for performing air traffic control tower operator duties.

(e) The authority exercised by the Federal Air Surgeon under paragraphs (a), (b), and (c) of this section is also exercised by the Chief, Aeromedical Certification Branch, Civil Aeromedical Institute, and each Regional Flight Surgeon.

§ 67.20 Applications, certificates, logbooks, reports, and records: falsification, reproduction, or alteration.

(a) No person may make or cause to be made—

(1) Any fraudulent or intentionally false statement on any application for a medical certificate under this Part;

(2) Any fraudulent or intentionally false entry in any logbook, record, or report that is required to be kept, made, or used, to show compliance with any requirement for any medical certificate under this Part;

(3) Any reproduction, for fraudulent purpose, of any medical certificate under this Part; or

(4) Any alteration of any medical certificate under this Part.

(b) The commission by any person of an act prohibited under paragraph (a) of this section is a basis for suspending or revoking any airman, ground instructor, or medical certificate or rating held by that person.

Subpart B—Certification Procedures

§ 67.21 Applicability.

This subpart prescribes the general procedures that apply to the issue of medical certificates for airmen.

§ 67.23 Medical examinations: who may give.

(a) *First class.* Any aviation medical examiner who is specifically designated for the purpose may give the examination for the first class certificate. Any interested person may obtain a list of these aviation medical examiners, in any area, from the FAA Regional Director of the region in which the area is located.

(b) *Second class and third class.* Any aviation medical examiner may give the examination for the second or third class certificate. Any interested person may obtain a list of aviation medical examiners, in any area, from the FAA Regional Director of the region in which the area is located.

§ 67.25 Delegation of authority.

(a) The authority of the Administrator, under section 602 of the Federal Aviation Act of 1958 (49 U.S.C. 1422), to issue or deny medical certificates is delegated to the Federal Air Surgeon, to the extent necessary to—

(1) Examine applicants for and holders of medical certificates for compliance with applicable medical standards; and

(2) Issue, renew, or deny medical certificates to applicants and holders based upon compliance or noncompliance with applicable medical standards.

Subject to limitations in this chapter, the authority delegated in subparagraphs (1) and (2) of this paragraph is also delegated to aviation medical examiners and to authorized representatives of the Federal Air Surgeon within the FAA.

(b) The authority of the Administrator, under subsection 314(b) of the Federal Aviation Act of 1958 (49 U.S.C. 1355(b)), to reconsider the action of an aviation medical examiner is delegated to the Federal Air Surgeon, the Chief, Aeromedical Certification Branch, Civil Aeromedical Institute, and each Regional Flight Surgeon. Except where the applicant does not meet the standards of §§ 67.13(d)(1)(i), (d)(2)(i), (e)(1), or (f)(1), 67.15(d)(1)(i), (d)(2)(i), (e), or (f)(1), or 67.17(d)(1)(i), (d)(2)(i), (e), or (f)(1), any action taken under this paragraph other than by the Federal Air Surgeon is subject to reconsideration by the Federal Air Surgeon.

A certificate issued by an aviation medical examiner is considered to be affirmed as issued unless an FAA official named in this paragraph on his own initiative reverses that issuance within 60 days after the date of issuance. However, if within 60 days after the date of issuance that official requests the certificate holder to submit additional medical information, he may on his own initiative reverse the issuance within 60 days after he receives the requested information.

(c) The authority of the Administrator, under section 609 of the Federal Aviation Act of 1958 (49 U.S.C. 1429), to re-examine any civil airman, to the extent necessary to determine an airman's qualification to continue to hold an airman medical certificate, is delegated to the Federal Air Surgeon and his authorized representatives within the FAA.

§ 67.27 Denial of medical certificate.

(a) Any person who is denied a medical certificate by an aviation medical examiner may, within 30 days after the date of the denial, apply in writing and in duplicate to the Federal Air Surgeon, Attention: Chief, Aeromedical Certification Branch, Civil Aeromedical Institute, Federal Aviation Administration, P.O. Box 26080, Oklahoma City, Okla. 73125, for reconsideration of that denial. If he does not apply for reconsideration during the 30 day period after the date of the denial, he is considered to have withdrawn his application for a medical certificate.

(b) The denial of a medical certificate—

(1) By an aviation medical examiner is not a denial by the Administrator under section 602 of the Federal Aviation Act of 1958 (49 U.S.C. 1422);

(2) By the Federal Air Surgeon is considered to be a denial by the Administrator under that section of the Act; and

(3) By the Chief, Aeromedical Certification Branch, Civil Aeromedical Institute, or a Regional Flight Surgeon is considered to be a denial by the Administrator under that section of the Act where the applicant does not meet the standards of §§ 67.13(d)(1)(i), (d)(2)(i), (e)(1), or (f)(1), 67.15(d)(1)(i), (d)(2)(i), (e), or (f)(1), or 67.17(d)(1)(i), (d)(2)(i), (e), or (f)(1).

Any action taken under § 67.25(b) that wholly or partly reverses the issue of a medical certificate by an aviation medical examiner is the denial of a medical certificate under this paragraph (b).

(c) If the issue of a medical certificate is wholly or partly reversed upon reconsideration by the Federal Air Surgeon, the Chief, Aeromedical Certification Branch, Civil Aeromedical Institute, or a Regional Flight Surgeon, the person holding that certificate shall surrender it, upon request of the FAA.

§ 67.29 Medical certificates by senior flight surgeons of Armed Forces.

(a) The FAA has designated senior flight surgeons of the Armed Forces on specified military posts, stations, and facilities, as aviation medical examiners.

(b) An aviation medical examiner described in paragraph (a) of this section may give physical examinations to applicants for FAA medical certificates who are on active duty or who are, under Department of Defense medical programs, eligible for FAA medical certification as civil airmen. In addition, such an examiner may issue or deny an appropriate FAA medical certificate in accordance with the regulations of this chapter and the policies of the FAA.

(c) Any interested person may obtain a list of the military posts, stations and facilities at which a senior flight surgeon has been designated as an aviation medical examiner, from the Surgeon General of the Armed Force concerned or from the Chief, Aeromedical Certification Branch, AC-130, Department of Transportation, Federal Aviation Administration, Civil Aeromedical Institute, P. O. Box 25082, Oklahoma City, Oklahoma 73125.

§ 67.31 Medical records.

Whenever the Administrator finds that additional medical informtion or history is necessary to determine whether an applicant for or the holder of a medical certificate meets the medical standards for it, he requests that person to furnish that information or authorize any clinic, hospital, doctor, or other person to release to the Administrator any available information or records concerning that history. If the applicant, or holder, refuses to provide the requested medical information or history or to authorize the release so requested, the Administrator may suspend, modify, or revoke any medical certificate that he holds or may, in the case of an applicant, refuse to issue a medical certificate to him.

☆ U.S. GOVERNMENT PRINTING OFFICE 1978 269-313-- 2680

##

Guide for length of leads AVR, AVL, AVF, V1 through V6

Guide for length of leads I, II, and III

INSTRUCTIONS FOR PREPARATION AND SUBMITTAL OF ELECTROCARDIOGRAM

1. Submit only original ECG tracings. Photostats are not acceptable.
2. ECG must be taken within 90 days prior to FAA physical examination.
3. Chest electrode placement as follows:
    V-1—At the 4th right interspace at the sternal border.
    V-2—At the 4th left interspace at the sternal border.
    V-3—Halfway between leads V-2 and V-4.
    V-4—At the 5th left interspace on the midclavicular line.
    V-5—Halfway between V-4 and V-6.
    V-6—On a line dropped perpendicularly from V-4 to the midaxillary line.
4. Show standardization on leads I and V-1.
5. Cut leads I, II, and III six inches long; leads AVR, AVL, AVF, and all V leads two inches long. (Guide provided above for measurements.)
6. Arrange leads in the order shown in line 3 above; mark lead number in upper left hand corner on the front of each segment.
7. Print applicant's name on the FRONT of the lead I portion of tracing.
8. Staple all tracings to identification card below at point indicated; tear off identification card along perforation; attach to Form FAA-8500-8, and mail to:

FEDERAL AVIATION ADMINISTRATION
Aeromedical Certification Branch
P.O. Box 25082
Oklahoma City, Oklahoma 73125

TYPE OR PRINT ALL IDENTIFYING INFORMATION REQUIRED BELOW

PILOT'S NAME (Last, First, Middle)	PILOT'S CERTIFICATE NO.	DATE OF BIRTH
MEDICAL EXAM CLASS-	DATE OF ECG	EXAMINER'S NAME AND SERIAL NO.
FAA USE ONLY MED. ID NO.		

STAPLE HERE

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

ELECTROCARDIOGRAM

FAA Form 8065-1 (6-67)
Supersedes previous edition

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

NEAR VISION ACUITY

SLOAN LETTERS

This chart should be held 16 inches (40cm) from the eyes, at right angles to the line of vision, and illuminated with not less than 10 or more than 25 foot candles of light.

LINEAR SNELLEN SCALE

20/20 [illegible]

20/25 [illegible]

20/30
N S Z V O   H Z V O D   S R N H O
K D C Z N   R O R H Z   N S V O Z

20/40
C V O R D   O S K D R   R K S O D
R O V D C   R C O S N   K V D Z V

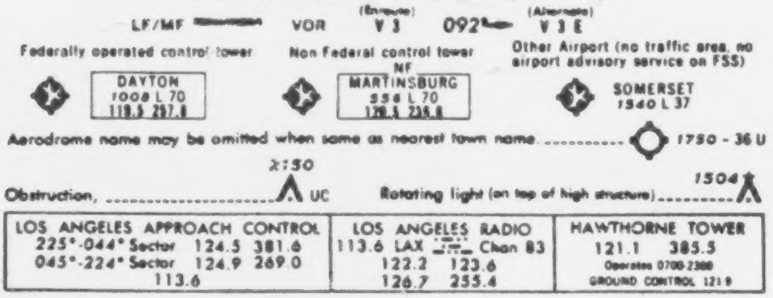
20/50
H N Z C O   S R V D K   R C O S N
K V C H D   N H R V Z   N K R V D

20/80
S O C Z N H R V D K N Z C O

20/100
R N H S O K D C Z V O S

20/200
D O N V R C K

AERONAUTICAL CHART READING


Low Altitude Federal Airways are indicated by center line
LF/MF
VOR
(Enroute)
V 3
092°
(Alternate)
V 3 E
Federally operated control tower
Non Federal control tower
Other Airport (no traffic area, no airport advisory service on FSS)
DAYTON
1008 L 70
118.5 257.8
NF
MARTINSBURG
556 L 70
120.5 236.8
SOMERSET
1540 L 37
Aerodrome name may be omitted when same as nearest town name
1750 - 36 U
2150
Obstruction,
UC
Rotating light (on top of high structure)
1504
LOS ANGELES APPROACH CONTROL
225°-044° Sector 124.5 381.6
045°-224° Sector 124.9 269.0
113.6
LOS ANGELES RADIO
113.6 LAX Chan 83
122.2 123.6
126.7 255.4
HAWTHORNE TOWER
121.1 385.5
Operates 0700-2300
GROUND CONTROL 121.9

FAA Form 8500–1 (4-66) SUPERSEDES FAA Form 2917

GPO : 1966 O - 331-343

DENIAL LETTER

Consideration of your application for airman medical certification and the medical examination completed on
discloses that you do not meet the standards prescribed in section(s)

of the Federal Aviation Regulations (FAR) because of the following conditions:

Therefore, pursuant to the authority delegated to me by the Administrator of the Federal Aviation Administration (FAA), your application for issuance of an airman medical certificate is hereby denied.

This denial does not constitute an action of the Administrator under section 602 of the Federal Aviation Act and is subject to reconsideration by the Federal Air Surgeon or his/her authorized representative. A request for such reconsideration may be made pursuant to section 67.27, Part 67 of the FAR, by submitting a written request to:

Federal Air Surgeon
Attn: Chief, Aeromedical Certification Branch, AAC-130
Federal Aviation Administration
P. O. Box 26080
Oklahoma City, Oklahoma 73125

In the event that a request for reconsideration is not made within 30 days of this action, we will assume that you have withdrawn your application for an airman medical certificate.

You are advised that it is unlawful under the FAR for you to exercise airman privileges unless you hold an appropriate medical certificate. Further, it is unlawful for the holder of a medical certificate to exercise such privileges if he/she has a known medical history or condition which makes him/her unable to meet the physical requirements for that certificate.

Sincerely,

FAA Form 8500-2(6-81)

DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration

INFORMATION FOR APPLICANTS DENIED AIRMAN MEDICAL CERTIFICATES

You have been denied the issuance of an airman medical certificate for the reasons stated in the cover letter. The decision constitutes a denial by the Administrator of the Federal Aviation Administration (FAA) under Section 67.27 of the Federal Aviation Regulations and Section 602(b) of the Federal Aviation Act of 1958 (49 USC 1422). Therefore, you may:

a. Accept the decision that you do not meet the medical standards under Part 67 of the Federal Aviation Regulations, in which case no further action is required on your part. This does not jeopardize your right to submit a future application.

b. Petition the FAA for an exemption from the applicable requirements of Part 67 of the Federal Aviation Regulations. In considering such a petition, the Federal Air Surgeon will obtain opinions of consultant medical specialists as considered appropriate and will determine whether the grant of an exemption in your particular case would be in the public interest, despite a previous finding that you do not meet prescribed regulatory standards. You may be requested to provide additional information to determine your qualifications for an exemption. A petition for exemption may be submitted in the form of a letter in duplicate addressed to:

Department of Transportation
Federal Aviation Administration
Attention: AAM-200
800 Independence Avenue, S.W.
Washington, D.C. 20591

c. Petition the National Transportation Safety Board (NTSB) within 60 days after this denial for a review of the Administrator's action, as provided in Section 602 of the Federal Aviation Act. The NTSB Rules of Practice require that such a petition contain a statement of the facts on which the petitioner's case rests. The NTSB may hold a formal hearing, at which time the Administrator, by legal counsel, would present documentary evidence and oral testimony by medical specialists supporting the decision that you do not meet the requirements of Part 67 of the Federal Aviation Regulations. The petitioner is given a similar opportunity to present evidence and testimony at the hearing. The Administrator's denial of your application is based upon the records which you have made available to the FAA. If you obtain additional medical evaluations or records, you should submit copies to the FAA prior to any hearing before the NTSB.

A petition for NTSB review may be submitted in the form of a letter addressed to:

National Transportation Safety Board
800 Independence Avenue, S.W.
Washington, D.C. 20594

It should be noted that while you have the right to petition the NTSB within 60 days following the Administrator's denial under Part 67, no similar appeal to the NTSB may be made on the basis of a denial of an exemption. Therefore, if you desire to petition the FAA for an exemption, but also wish to pursue your present right for review by the NTSB, you may submit both petitions and may request the NTSB to hold its action in abeyance pending outcome of your request for an exemption. An unfavorable decision concerning a petition for exemption will not be prejudicial in action before the NTSB. In a similar manner, a decision by the NTSB that a petitioner does not meet the medical standards of Part 67 will not adversely affect consideration of a petition for exemption.

FAA Form 8500-4.1

Form Approved Budget Bureau No. 04-R0163

DEPARTMENT OF TRANSPORTATION-FEDERAL AVIATION ADMINISTRATION

REPORT OF EYE EVALUATION

1. DATE

2A. NAME OF AIRMAN	2B. DATE OF BIRTH	2C. SEX

3. ADDRESS OF AIRMAN

4. HISTORY–Record pertinent history, past and present, concerning general health and visual problems.

5. HETEROPHORIA–Record phorias, in prism diopters, with and without best lens correction in place *(Use Maddox Rod)*

	(1) AT 20 FEET			(2) AT 18 INCHES		
A. WITHOUT CORRECTION	EXO.	ESO.	HYPER.	EXO.	ESO.	HYPER.
	(1) AT 20 FEET			(2) AT 18 INCHES		
B. WITH CORRECTION *(If any)*	EXO.	ESO.	HYPER.	EXO.	ESO.	HYPER.

6. FUSION–Estimate fusion ability and state methods used in examination. *(Red lens, etc.)*

7. PUPILS–Statement of relative size and reaction of the pupils to accomodation and light, direct and consensual.

8. VISUAL FIELDS–Record results and type of test performed *(Attach field charts, if used)*

9. OPHTHALMOSCOPIC–Describe any variations from normal in either eye on funduscopic examination.

10. SLIT LAMP–Record results of slit lamp examination of each eye where indicated.

11. INTRAOCULAR PRESSURE–Record results and method used.

A. METHOD USED	O.D.	O.S.

12. VISUAL ACUITY *(Snellen linear values)*

	TEST METHOD	UNCORRECTED			LENSES USED	CORRECTED VISUAL ACUITY		
		OD	OS	OU		OD	OS	OU
A. NEAR VISION					CONTACT LENSES ONLY			
					GLASSES ONLY			
					GLASSES WITH CONTACTS			

NOTE-If contact lenses are used, corrected near visual acuity should be determined while these lenses are worn. Indicate if the contact lenses used (if any) were bifocal.

	TEST METHOD	UNCORRECTED			LENSES USED	CORRECTED VISUAL ACUITY		
		OD	OS	OU		OD	OS	OU
B. DISTANT VISION					CONTACT LENSES			
					GLASSES			

NOTE - If contact lenses are used, record after four to six hours wear and then with glasses immediately after removal of contacts. If visual acuity is not the same as for contact lenses, indicate length of time *(within reason)* before vision returns to best obtainable with glasses.

	IF CONTACT LENSES ARE WORN		BEFORE CONTACT LENSES WERE FITTED *(If available)*	
C. KERATOMETER READINGS	O.D.	O.S.	O.D.	O.S.

FAA Form 8500-7 (2-76) SUPERSEDES PREVIOUS EDITION

13. PRESENT PRESCRIPTION *(Sphere, cylinder, axis)*

A. CONTACT LENSES		B. GLASSES	
OD	OS	OD	OS

IF CONTACT LENSES ARE NOT USED, OMIT ITEMS 14-19.

14. DATE OF FITTING OF PRESENT CONTACT LENSES *(NOTE - Adaptive period of 3 months required)*

15. DESCRIPTION OF CONTACT LENSES UTILIZED

A. MANUFACTURER

B. TYPE OF LENSES *(Corneal, scleral, lenticular, single-cut, bifocal, toric, [illegible], special shape, etc.)*

C. COLOR AND GRADE OF TINTING, IF ANY, AND REASON FOR TINTING *(Cosmetic, light sensitivity, etc.)*

16. BACKUP SET - Is a backup set of spectacles available for immediate use?

17. EXAMINATION FREQUENCY - Indicate frequency of periodic followup examination.

18. SYMPTOMS OR ABNORMAL CONDITIONS - Note any lacrimation, photophobia, loss of lens, or evidence of corneal injury or edema, etc., requiring treatment and/or interruption of contact lens wearing. State results of slit lamp or biomicroscopic examination of cornea.

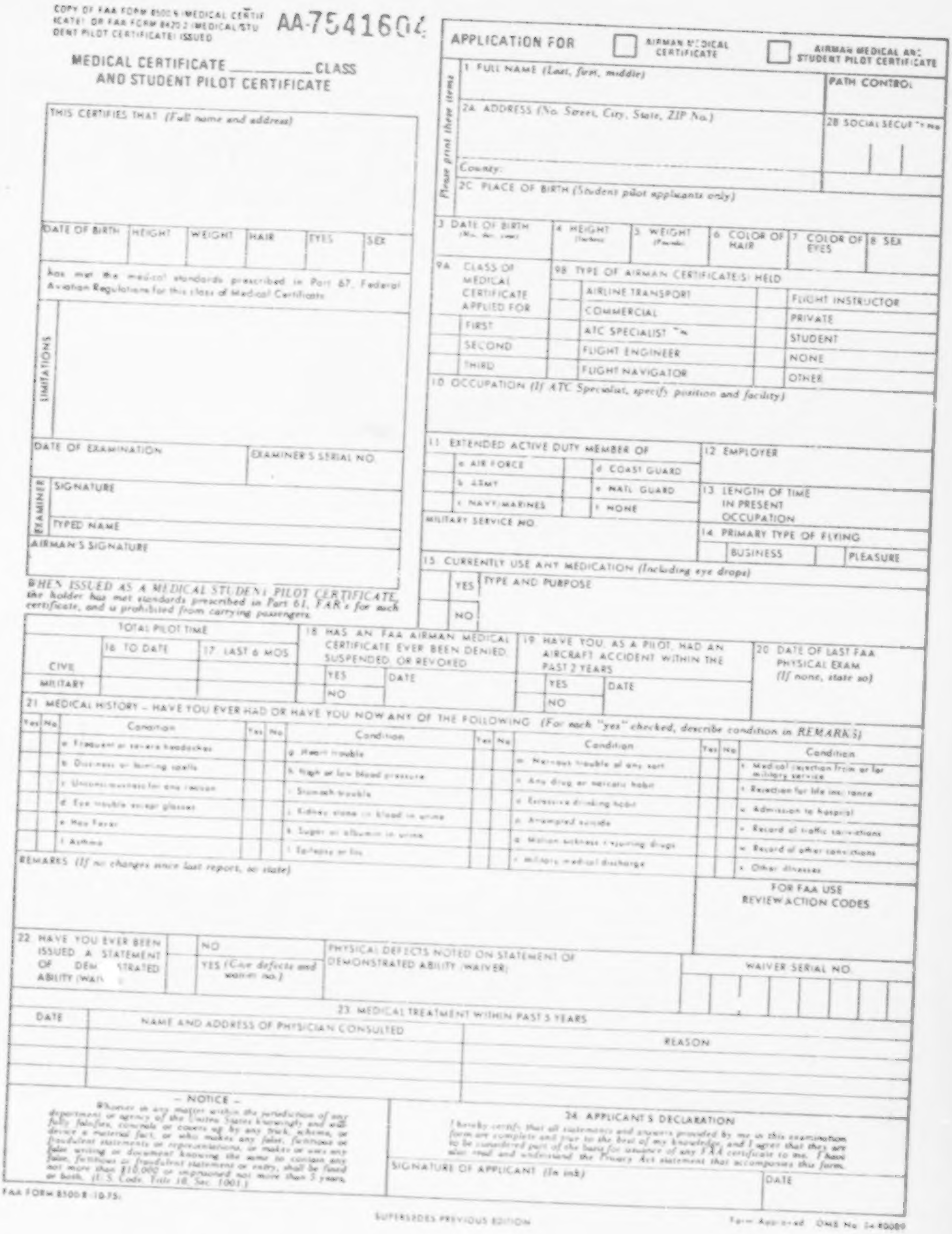
19. TOLERANCE *(Period of Wear)*

A. DAYS CONTACT LENSES WORN DURING LAST MONTH	B. DAILY WEARING TIME IN HOURS

20. PROFESSIONAL EVALUATION - Indicate your professional opinion and any other comment or additional observations.

21A. TYPED NAME AND ADDRESS OF EYE SPECIALIST	21B. SIGNATURE OF EYE SPECIALIST

☆ U.S. GOVERNMENT PRINTING OFFICE: 1978-211-372/655



COPY OF FAA FORM 8500-9 (MEDICAL CERTIFICATE) OR FAA FORM 8420-2 (MEDICAL/STUDENT PILOT CERTIFICATE) ISSUED

AA-7541604

MEDICAL CERTIFICATE __________ CLASS AND STUDENT PILOT CERTIFICATE

THIS CERTIFIES THAT *(Full name and address)*

DATE OF BIRTH	HEIGHT	WEIGHT	HAIR	EYES	SEX

has met the medical standards prescribed in Part 67, Federal Aviation Regulations for this class of Medical Certificate

LIMITATIONS

DATE OF EXAMINATION

EXAMINER'S SERIAL NO.

EXAMINER

SIGNATURE

TYPED NAME

AIRMAN'S SIGNATURE

WHEN ISSUED AS A MEDICAL STUDENT PILOT CERTIFICATE, the holder has met standards prescribed in Part 61, FAR's for such certificate, and is prohibited from carrying passengers.

APPLICATION FOR ☐ AIRMAN MEDICAL CERTIFICATE ☐ AIRMAN MEDICAL AND STUDENT PILOT CERTIFICATE

Please print these items

1. FULL NAME *(Last, first, middle)*

PATH CONTROL

2A. ADDRESS *(No. Street, City, State, ZIP No.)*

County:

2B SOCIAL SECURITY No.

2C. PLACE OF BIRTH *(Student pilot applicants only)*

3. DATE OF BIRTH (Mo., day, year)	4. HEIGHT (Inches)	5. WEIGHT (Pounds)	6. COLOR OF HAIR	7. COLOR OF EYES	8. SEX

9A. CLASS OF MEDICAL CERTIFICATE APPLIED FOR		9B. TYPE OF AIRMAN CERTIFICATE(S) HELD			
		☐	AIRLINE TRANSPORT	☐	FLIGHT INSTRUCTOR
		☐	COMMERCIAL	☐	PRIVATE
☐	FIRST	☐	ATC SPECIALIST	☐	STUDENT
☐	SECOND	☐	FLIGHT ENGINEER	☐	NONE
☐	THIRD	☐	FLIGHT NAVIGATOR	☐	OTHER

10. OCCUPATION *(If ATC Specialist, specify position and facility)*

11. EXTENDED ACTIVE DUTY MEMBER OF

☐	a. AIR FORCE	☐	d. COAST GUARD
☐	b. ARMY	☐	e. NAT'L GUARD
☐	c. NAVY/MARINES	☐	f. NONE

MILITARY SERVICE NO.

12. EMPLOYER

13. LENGTH OF TIME IN PRESENT OCCUPATION

14. PRIMARY TYPE OF FLYING ☐ BUSINESS ☐ PLEASURE

15. CURRENTLY USE ANY MEDICATION *(Including eye drops)*

☐ YES TYPE AND PURPOSE

☐ NO

TOTAL PILOT TIME	16. TO DATE	17. LAST 6 MOS
CIVIL		
MILITARY		

18. HAS AN FAA AIRMAN MEDICAL CERTIFICATE EVER BEEN DENIED, SUSPENDED, OR REVOKED ☐ YES ☐ NO DATE

19. HAVE YOU, AS A PILOT, HAD AN AIRCRAFT ACCIDENT WITHIN THE PAST 2 YEARS ☐ YES ☐ NO DATE

20. DATE OF LAST FAA PHYSICAL EXAM *(If none, state so)*

21. MEDICAL HISTORY – HAVE YOU EVER HAD OR HAVE YOU NOW ANY OF THE FOLLOWING *(For each "yes" checked, describe condition in REMARKS)*

Yes	No	Condition	Yes	No	Condition	Yes	No	Condition	Yes	No	Condition
		a. Frequent or severe headaches			g. Heart trouble			m. Nervous trouble of any sort			s. Medical rejection from or for military service
		b. Dizziness or fainting spells			h. High or low blood pressure			n. Any drug or narcotic habit			t. Rejection for life insurance
		c. Unconsciousness for any reason			i. Stomach trouble			o. Excessive drinking habit			u. Admission to hospital
		d. Eye trouble except glasses			j. Kidney stone or blood in urine			p. Attempted suicide			v. Record of traffic convictions
		e. Hay Fever			k. Sugar or albumin in urine			q. Motion sickness requiring drugs			w. Record of other convictions
		f. Asthma			l. Epilepsy or fits			r. Military medical discharge			x. Other diseases

REMARKS *(If no changes since last report, so state)*

FOR FAA USE
REVIEW ACTION CODES

22. HAVE YOU EVER BEEN ISSUED A STATEMENT OF DEMONSTRATED ABILITY (WAIVER) ☐ NO ☐ YES *(Give defects and waiver no.)*

PHYSICAL DEFECTS NOTED ON STATEMENT OF DEMONSTRATED ABILITY (WAIVER)

WAIVER SERIAL NO.

23. MEDICAL TREATMENT WITHIN PAST 5 YEARS

DATE	NAME AND ADDRESS OF PHYSICIAN CONSULTED	REASON

– NOTICE –

Whoever in any matter within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals or covers up by any trick, scheme, or device a material fact, or who makes any false, fictitious or fraudulent statements or representations, or makes or uses any false writing or document knowing the same to contain any false, fictitious or fraudulent statement or entry, shall be fined not more than $10,000 or imprisoned not more than 5 years, or both. (U.S. Code, Title 18, Sec. 1001.)

24. APPLICANT'S DECLARATION

I hereby certify that all statements and answers provided by me in this examination form are complete and true to the best of my knowledge, and I agree that they are to be considered part of the basis for issuance of any FAA certificate to me. I have also read and understand the Privacy Act statement that accompanies this form.

SIGNATURE OF APPLICANT *(In ink)*

DATE

FAA FORM 8500-8 (10-75)

SUPERSEDES PREVIOUS EDITION

Form Approved OMB No. 04-R0089

REPORT OF MEDICAL EXAMINATION

NORMAL	CHECK EACH ITEM IN APPROPRIATE COLUMN *(Enter NE if not evaluated)*	ABNORMAL
	25 Head, face, neck and scalp	
	26 Nose	
	27 Sinuses	
	28 Mouth and throat	
	29 Ears, general *(Internal and external canals; Auditory acuity under item 49)*	
	30 Drums *(Perforation)*	
	31 Eyes, general *(Visual acuity under items 50 & 51)*	
	32 Ophthalmoscopic	
	33 Pupils *(Equality and reaction)*	
	34 Ocular motility *(Associated parallel movement, nystagmus)*	
	35 Lungs and chest *(Including breasts)*	
	36 Heart *(Thrust, size, rhythm, sounds)*	
	37 Vascular system	
	38 Abdomen and viscera *(Including hernia)*	
	39 Anus and rectum *(Hemorrhoids, fistula, prostate)*	
	40 Endocrine system	
	41 G-U system	
	42 Upper and lower extremities *(Strength, range of motion)*	
	43 Spine, other musculoskeletal	
	44 Identifying body marks, scars, tattoos	
	45 Skin and lymphatics	
	46 Neurologic *(Tendon reflexes, equilibrium, senses, coordination, etc.)*	
	47 Psychiatric *(Specify any personality deviation)*	
	48 General systemic	

NOTES Describe every abnormality in detail; enter applicable item number before each comment. Use additional sheets if necessary and attach to this form.

FOR FAA USE PATHOLOGY CODE NOS

49 HEARING	RIGHT EAR				LEFT EAR			
WHISPERED VOICE (STANDING SIDEWAYS DISTANT EAR CLOSED)	FT				FT			
	500	1000	2000	4000	500	1000	2000	4000
AUDIOMETER *(Decibel Loss)*								

50 DISTANT VISION *(Standard test types only)*			51 NEAR VISION *(Use linear values)*	
RIGHT EYE	20/	CORRECTED TO 20/	20/	CORRECTED TO 20/
LEFT EYE	20/	CORRECTED TO 20/	20/	CORRECTED TO 20/
BOTH EYES	20/	CORRECTED TO 20/	20/	CORRECTED TO 20/

52 INTRAOCULAR TENSION *(Tonometry required for Air Traffic Control Specialist)*

	TACTILE	RIGHT EYE	LEFT EYE
	TONOMETRIC		

53 COLOR VISION *(Test used, number of plates missed)*

54 FIELD OF VISION		55 HETEROPHORIA DIOPTERS *(Not required for Class Three)*				
RIGHT EYE	LEFT EYE	DISTANCE	ESOPHORIA	EXOPHORIA	RIGHT H	LEFT H

56 BLOOD PRESSURE			57 PULSE *(Wrist)*		
RECUMBENT MM MERCURY	SYSTOLIC	DIASTOLIC	RESTING	AFTER EXERCISE	2 MINUTES AFTER EXERCISE

58 URINALYSIS		59 ECG *(Date)*	60 OTHER TESTS
ALBUMIN	SUGAR		

61 COMMENTS ON HISTORY AND FINDINGS, RECOMMENDATIONS *(Attach all consultation reports, ECGs, X-rays, etc. to this report before mailing)*

FOR FAA USE	
CODED	
PUNCHED	
VERIFIED	
EXAMINER CODES	
CLERICAL REJECT	

62 APPLICANT'S NAME

HAS BEEN ISSUED ☐ MED. CERTIF. ☐ MED. AND STUDENT PILOT CERTIF.

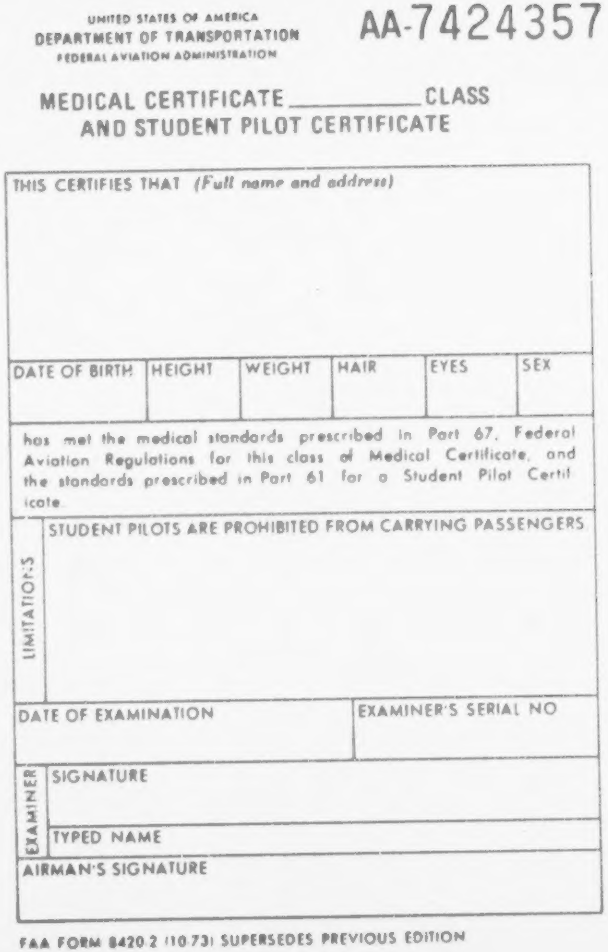
☐ NO CERTIF. ISSUED. FURTHER EVALUATION REQUIRED

☐ HAS BEEN DENIED. LETTER OF DENIAL ISSUED. (Copy attached)

63 DISQUALIFYING DEFECTS *(List by item no.)*

64 MEDICAL EXAMINER'S DECLARATION *I hereby certify that I personally examined the applicant named on this medical examination report, and that this report with any attachment embodies my findings completely and correctly.*

DATE OF EXAMINATION	AVIATION MEDICAL EXAMINER'S NAME AND ADDRESS *(Type or print)*	AVIATION MEDICAL EXAMINER'S SIGNATURE



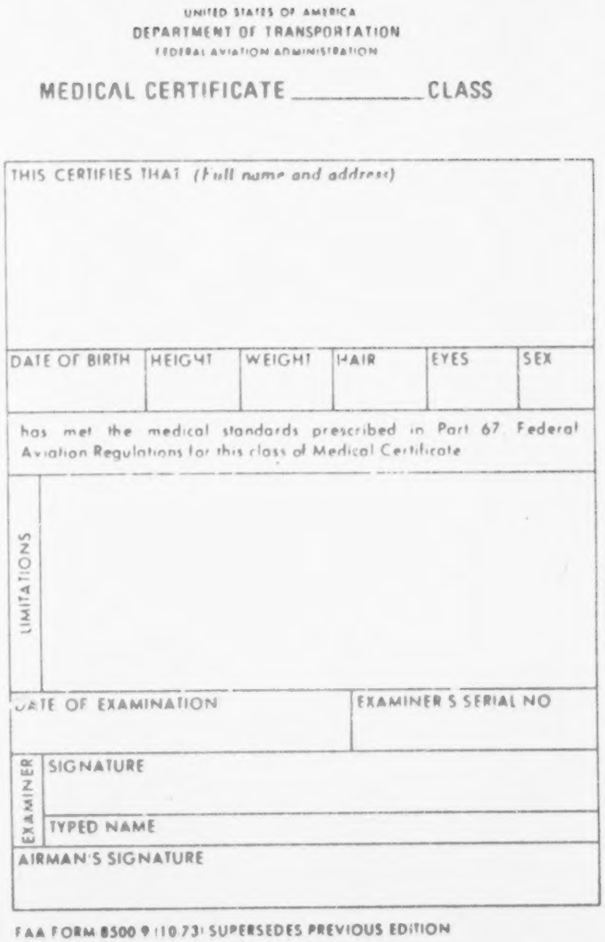
UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

AA-7424357

MEDICAL CERTIFICATE __________ CLASS
AND STUDENT PILOT CERTIFICATE

THIS CERTIFIES THAT *(Full name and address)*					
DATE OF BIRTH	HEIGHT	WEIGHT	HAIR	EYES	SEX
has met the medical standards prescribed in Part 67, Federal Aviation Regulations for this class of Medical Certificate, and the standards prescribed in Part 61 for a Student Pilot Certificate.					
LIMITATIONS	STUDENT PILOTS ARE PROHIBITED FROM CARRYING PASSENGERS				
DATE OF EXAMINATION			EXAMINER'S SERIAL NO		
EXAMINER	SIGNATURE				
EXAMINER	TYPED NAME				
AIRMAN'S SIGNATURE					

FAA FORM 8420.2 (10.73) SUPERSEDES PREVIOUS EDITION



UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

MEDICAL CERTIFICATE __________ CLASS

THIS CERTIFIES THAT *(Full name and address)*					
DATE OF BIRTH	HEIGHT	WEIGHT	HAIR	EYES	SEX
has met the medical standards prescribed in Part 67, Federal Aviation Regulations for this class of Medical Certificate					
LIMITATIONS					
DATE OF EXAMINATION			EXAMINER'S SERIAL NO		
EXAMINER	SIGNATURE				
EXAMINER	TYPED NAME				
AIRMAN'S SIGNATURE					

FAA FORM 8500.9 (10.73) SUPERSEDES PREVIOUS EDITION

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

MEDICAL FORMS AND STATIONERY REQUISITION

CONCUR	ROUTING SYMBOL	DATE

Please send me the quantity of items requested below:

QTY.	FAA FORM OR ENVELOPE	TITLE
	FAA 8025-2	Aircraft Accident Medical Info
	FAA 8500-1	Near Vision Acuity Test Card
	FAA 8500-2	Letter of Denial
	FAA 8500-7	Report of Eye Evaluation
	FAA 8500-8	Application for Airman Medical Certificate
	FAA 8500-11	Medical Forms and Stationery Requisition
	FAA 8500-12	Instructions for Completion of Application for Airman Certificate
	FAA 8500-14	Ophthalmological Evaluation for Glaucoma
	FAA 8500-17	Specifications for Initial Evaluation, Abnormal Carbohydrate Metabolism
	FAA 8500-18	Specifications for Followup Evaluation, Abnormal Carbohydrate Metabolism
	FAA 8500-19	Cardiovascular Evaluation Specifications
	FAA 8500-21	Authorization for the Release of Medical Information to the FAA
	Envelopes	Aeromedical Certification, Self-Addressed
	Envelopes	Regional Office, Self-Addressed

FAA DESIGNATION NO.	DATE
NAME OF AME OR MILITARY INSTALLATION	
STREET ADDRESS	
CITY AND STATE	ZIP CODE

FAA Form 8500-11 (9-80) SUPERSEDES PREVIOUS EDITION

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

INSTRUCTIONS FOR COMPLETION OF APPLICATION FOR AIRMAN MEDICAL CERTIFICATE OR AIRMAN MEDICAL AND STUDENT PILOT CERTIFICATE, FAA FORM 8500-8

Items 1 through 24 of the application will be filled in completely by the applicant using ballpoint pen or indelible pencil. Exert sufficient pressure to make legible copies. Applicant will indicate type of certificate for which he is applying (Space provided in upper right-hand corner of form). The following numbered instructions apply to the numbered items on the application form:

1. FULL NAME – To be printed. A married woman will list the family name of the husband first, then her given name and maiden name.

2A. ADDRESS – To be printed. Give permanent mailing address, and county. Include ZIP code after state.

2B. SOCIAL SECURITY NUMBER.

2C. PLACE OF BIRTH – (Student Pilot Applicants only)

3. DATE OF BIRTH – Specify month, day, and year. Abbreviate the month with letters, e.g., Apr. 30, 1923.

4. HEIGHT – In inches to the nearest ½ inch.

5. WEIGHT – To the nearest pound.

6. COLOR OF HAIR – Specify as brown, black, blond, gray, or red. If bald, so state. Do not abbreviate.

7. COLOR OF EYES – Specify as brown, black, blue, hazel, gray, or green. Do not abbreviate.

8. SEX – Indicate male or female.

9A. CLASS OF MEDICAL CERTIFICATE APPLIED FOR – Check applicable block.

9B. TYPE OF AIRMAN CERTIFICATE(S) HELD – Check applicable block.

10. OCCUPATION – Indicate major employment. "Pilot" will be used only for those gaining their livelihood by flying.

11. EXTENDED ACTIVE DUTY MEMBER OF – Applies only to present members of the armed forces, and does not include reservists serving on 2-week active duty tours. Enter serial number. MILITARY SERVICE NO. - Required of all former and active military personnel.

12. EMPLOYER – State employer. If self-employed, so state.

13. LENGTH OF TIME IN PRESENT OCCUPATION – Years by employer noted in item 12.

14. PRIMARY TYPE OF FLYING – Indicate whether majority of flying is for business or for pleasure.

15. CURRENTLY USE ANY MEDICATION *(including eye drops)* – Check "no" or "yes." If "yes" is checked, state type and purpose.

16. TOTAL PILOT TIME TO DATE – Give total number of hours civil and/or military. Indicate whether logged or estimates. Abbreviate as Log. or Est.

17. TOTAL PILOT TIME LAST 6 MONTHS – Give number of hours civil and/or military in the 6-month period immediately preceding date of this application. Indicate whether logged or estimated. Abbreviate as Log. or Est.

18. HAS AN FAA AIRMAN MEDICAL CERTIFICATE EVER BEEN DENIED, SUSPENDED, OR REVOKED – Check "yes" or "no." If "yes" is checked, give date of action.

19. HAVE YOU, AS A PILOT, HAD AN AIRCRAFT ACCIDENT WITHIN THE PAST 2 YEARS – Check "yes" or "no." If "yes" is checked, give date of accident.

20. DATE OF LAST FAA PHYSICAL EXAMINATION – If none, so state.

21. MEDICAL HISTORY – Each item under this heading must be checked either "yes" or "no." For all items checked "yes" a description of the condition will be given in the "Remarks" section. If explanation has been given on previous report(s), and there has been no change in the condition, applicant may state "previously explained no change." Of particular importance are conditions which have developed in the interim since your last FAA physical examination. REMARKS – Amplify any items checked "yes" under "medical history." If more space is needed, use plain sheet of paper bearing signature of applicant.

22. HAVE YOU EVER BEEN ISSUED A STATEMENT OF DEMONSTRATED ABILITY *(WAIVER)* – Check "no" or "yes." If "yes" is checked, enter physical defects as noted on the waiver, and waiver serial number in the spaces provided. If waiver contains no serial number, so state.

23. MEDICAL TREATMENT WITHIN PAST 5 YEARS – List all conditions for which a doctor was consulted. Give date, and address of physician or hospital, and briefly state reason for consulting doctor. If explanation has been given on previous report(s), and there has been no change in the condition, applicant may state "previously explained, no change." Of particular importance are conditions which have developed in the interim since your last FAA physical examination.

24. APPLICANT'S DECLARATION – To be signed and dated by the applicant, after he has read the declaration.

HAVE ALL BLOCKS BEEN COMPLETED?

FEDERAL AVIATION ADMINISTRATION

OFFICE OF AVIATION MEDICINE

FAA Form 8500-12 (9-67) SUPERSEDES FAA FORM 3834

Form Approved: Budget Bureau No. 004-R0181

DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION

OPHTHALMOLOGICAL EVALUATION FOR GLAUCOMA

1. DATE

2A. NAME OF AIRMAN

2B. DATE OF BIRTH

2C. SEX

3. ADDRESS OF AIRMAN

4. HISTORY - Record pertinent history, past and present, concerning general health and visual problems.

5. FAMILY HISTORY OF GLAUCOMA

6. DIAGNOSIS

A. TYPE (Check one)

☐ SIMPLE, WIDE ANGLE, OPEN ANGLE ☐ CLOSED ANGLE, NARROW ANGLE, ANGLE CLOSURE

B. DISCOVERY - e.g., routine examination, FAA physical examination, acute symptoms, reduction in visual acuity, etc.

C. CONFIRMATION - Tonometric readings, gonioscopy, visual fields, tonography, or provocative tests. GIVE METHODS, RESULTS, AND DATE CONFIRMED.

7. SURGERY -

A. IF SURGERY HAS BEEN PERFORMED, INDICATE WHICH EYE AND TYPE OF SURGERY

B. IS SURGERY ANTICIPATED WITHIN 24 MONTHS?

☐ YES, PROBABLE ☐ NO, NOT LIKELY

8. INITIAL RESPONSE TO THERAPY - Indicate results including strength, frequency, and type of medication used at that time.

9. PRESENT TREATMENT - Indicate exact type, strength, frequency, and name of medication being used.

10. ADEQUACY OF CONTROL

A. DESCRIBE PRIOR CONTROL, INCLUDING SERIAL TONOMETRIC FINDINGS, CHANGES IN VISUAL FIELDS, ETC.

B. MAXIMUM INTRAOCULAR PRESSURES IN RELATIONSHIP TO DAILY MEDICATION (If known)

C. INTRAOCULAR PRESSURE

O.D.	O.S.	TEST METHOD USED	TIME SINCE LAST MEDICATION

NOTE - Pressures should NOT be taken within 2 hours after use of medication unless 10.B. is completed.

FAA Form 8500-14 (2-76) SUPERSEDES PREVIOUS EDITION

11. FIELD OF VISION—Record physiological and any pathological peripheral or central visual field losses from a perimeter and or tangent screen using white test object. — *FORWARD CHARTS.*

A. DID EXAMINEE WEAR GLASSES OR CONTACT LENSES DURING TEST? *(Specify which)*	B. SIZE OF TEST OBJECT USED WITH TANGENT SCREEN

12. VISUAL ACUITY—Record *(Use Snellen linear values)*

		UNCORRECTED			CORRECTED		
A. DISTANT	TEST METHOD USED	O.D.	O.S.	O.U.	O.D.	O.S.	O.U.
B. NEAR	TEST METHOD USED	O.D.	O.S.	O.U.	O.D.	O.S.	O.U.

C. IMPORTANT—If correction is needed and there is inability to correct either eye to 20/20 or better, give reasons.

13. PRESENT CORRECTION

A. DOES AIRMAN WEAR	O.D.	O.S.
☐ GLASSES ☐ CONTACT LENSES	SPHERE—CYLINDER—AXIS	SPHERE—CYLINDER—AXIS

14. PUPILS—Statement of relative size and reaction of the pupils to accomodation and light, with special reference to any disease process, healed or active.

15. OPHTHALMOSCOPIC—Describe any variations from normal in either eye on funduscopic examinations, with special reference to any disease process, healed or active.

16. SLIT LAMP—Record results of slit lamp examination of each eye where indicated.

17. FUSION—Estimate fusion ability and state methods used in examination.

18A. TYPED NAME AND ADDRESS OF OPHTHALMOLOGIST	18B. SIGNATURE OF OPHTHALMOLOGIST

☆ U.S. GOVERNMENT PRINTING OFFICE: 1976-822-155/434

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

SPECIFICATIONS FOR INITIAL EVALUATION ABNORMAL CARBOHYDRATE METABOLISM

It is of primary importance that a good baseline be established for airmen seeking medical certification when there is an indication of disturbance of carbohydrate metabolism. When prior clinical information exists (hospital records, laboratory reports, out-patient resumés, etc.) this should be submitted. When the prior information submitted includes data required below, the tests need not be updated if no more than 90 days old at the time of examination. Actual electrocardiographic tracings should be forwarded with the evaluation report.

1. General medical history, complaints.
2. Family and personal history relative to diabetes.
3. Height and weight with explanation of any recent changes in weight.
4. Ophthalmoscopic examination.
5. Vibration sense of the extremities.
6. Cardiovascular examination:

    A. History specific for cardiovascular disease.
    B. Blood pressure (brachial arteries; sitting)
    C. Circulatory efficiency in extremities.
    D. Standard 12-lead resting electrocardiogram.
    E. Double Master's exercise electrocardiogram (unless medically contraindicated; protocol attached).
    F. Blood lipid determination (total cholesterol and triglycerides).

7. Report of chest x-ray.
8. Urinalysis for specific gravity, albumin, sugar and acetone.
9. Statement concerning present need for insulin or other hypoglycemic medication for maintenance of control. If medication has previously been required for control of carbohydrate metabolism, specify types and date that latest medication was discontinued.*
10. Blood glucose determination.

    A. If a prior "diagnostic" glucose tolerance test (GTT) has been made, the results should be submitted along with current fasting and 2-hour postprandial blood sugar test results (with urine sugar and acetone findings).

    B. If no prior GTT diagnostic for diabetes, a current GTT should be submitted (3-hour acceptable, 5-hour preferred).

* IMPORTANT NOTE: Certification will be considered only if adequate control can be accomplished and maintained without use of hypoglycemic drugs. If use of medication has only recently been discontinued, control is to be demonstrated by fasting and 2-hour postprandial blood sugar tests taken at 30-day intervals during a 90-day period. Prior studies may be acceptable. Urine sugars a.c. and h.s. are helpful.

In all blood sugar testing the following information should be furnished in addition to the numerical measurement:

1. Applicant preparation and test load (see below-GTT).
2. Nature of sample (plasma or whole blood).
3. Test method with notation as to the laboratory's "normal" value and whether correction factors have already been incorporated to make readings equivalent to whole venous blood.

Blood sugar tests should be specific (true blood glucose), such as the Somogyi-Nelson or Autoanalyzer. The Folin-Wu is non-specific. Values obtained from capillary blood (as by finger prick) can be converted roughly to "true" glucose values (whole venous blood) by subtracting 30 mg. per 100 ml. Autoanalyzer results are usually plasma glucose levels, which generally are 25 mg. per 100 ml. higher than whole venous blood.

A postprandial blood sample should be drawn 2 hours following ingestion of 100 grams of carbohydrate (loading dose). This may be accomplished by a solution containing 100 grams of glucose, by one of the commerical preparations containing an equivalent load, or where intolerance or nausea is anticipated, by a meal such as the following:

Banana, 8 ozs. cereal, 2 slices white bread with butter
8 ozs. milk and 4 ozs. orange juice.

A glucose tolerance test conducted for FAA medical certification purposes will follow these guidelines:

1. For 3 days before examination, the applicant will have eaten a full diet containing 250-300 grams of carbohydrates daily. Physical activity should not be curtailed during this period.
2. Birth control pills, thiazide diuretics, steroids and other drugs which may alter carbohydrate metabolism (including large doses of aspirin or nicotinic acid) should be avoided.
3. Applicant fasts after midnight preceding the day of the test (8-16 hrs.)
4. Fasting blood and urine specimens are obtained (preferably in the A.M.)
5. A loading dose of no more than 100 grams of glucose is ingested (water load should not be excessive).
6. Blood and urine glucose are determined at 30 minutes, one hour, two hours and three hours after ingestion of the loading dose (4 and 5-hour samples are helpful but not required).

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

SPECIFICATIONS FOR FOLLOWUP EVALUATION ABNORMAL CARBOHYDRATE METABOLISM

1. Significant interval history.
2. Weight with explanation of any changes since last examination.
3. Ophthalmoscopic examination.
4. Vibration sense of the extremities.
5. Full explanation of any interim problems in maintaining constant control without use of hypoglycemic drugs.
6. Current fasting and 2-hour postprandial blood sugar determinations with urine sugar and acetone findings.
7. Blood pressure and any significant interim history of cardiovascular symptomatology.
8. Resting electrocardiogram (annually). At least for those First and Second Class applicants over age 40, a more thorough cardiovascular assessment is to be made annually, to include an appraisal of circulatory efficiency and exercise electrocardiogram (protocol attached if required with this evaluation; never required if medically contraindicated).

A postprandial blood sample should be drawn 2 hours following ingestion of 100 grams of carbohydrate (loading dose). This may be accomplished by a solution containing 100 grams of glucose, by one of the commercial preparations containing an equivalent load or, where intolerance or nausea is anticipated, by a meal such as the following:

Banana, 8 ozs. cereal, 2 slices white bread with butter
8 ozs. milk and 4 ozs. orange juice.

In all blood sugar testing the following information should be furnished in addition to the numerical measurement:

1. Applicant preparation and test load.
2. Nature of sample -- plasma or whole blood.
3. Test method with notation as to the laboratory's "normal" value and whether correction factors have already been incorporated to make readings equivalent to whole venous blood.

Blood sugar tests should be specific (true blood glucose), such as the Somogyi-Nelson or Autoanalyzer. The Folin-Wu is non-specific. Values obtained from capillary blood (as by finger prick) can be converted roughly to "true" glucose values (whole venous blood) by subtracting 30 mg. per 100 ml. Autoanalyzer results are usually plasma glucose levels, which generally are 25 mg. per 100 ml. higher than whole venous blood.

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

CARDIOVASCULAR EVALUATION SPECIFICATIONS

These specifications have been developed by the Federal Aviation Administration (FAA) to determine an applicant's eligibility for airman medical certification. Standardization of examination methods and reporting is essential to provide sufficient basis for making this determination and the prompt processing of applications. This cardiovascular evaluation, therefore, must be reported in sufficient detail to permit a clear and objective evaluation of the cardiovascular disorder(s) with emphasis on the degree of functional recovery and prognosis. It must be performed by a specialist in internal medicine or cardiology and should be forwarded to the FAA immediately upon completion. Inadequate evaluation or reporting, or failure to promptly submit the report to the FAA, may delay the certification decision. As a minimum, the evaluation must include the following:

I. MEDICAL HISTORY. Particular reference should be given to cardiovascular abnormalities —cerebral, visceral, and/or peripheral. A statement must be included as to whether medications are currently or have been recently used, and if so, the type, purpose, dosage, duration of use and other pertinent details must be given. A specific history of any anticoagulant drug therapy is required. In addition, any history of hypertension must be fully developed and if thiazide diuretics are being taken, values for serum potassium should be reported. A comment should be included on any important or unusual dietary programs.

II. FAMILY, PERSONAL, AND SOCIAL HISTORY. A statement of the ages and health status of parents and siblings is necessary; if deceased, age at death and cause should be included. Also, an indication of whether any near blood relative has had "heart attacks," hypertension, diabetes or known disorders of lipid metabolism must be provided. Smoking, drinking and recreational habits of the applicant are pertinent as well as whether a program of physical fitness is being maintained. Comments on the level of physical activities, functional limitations, occupational and avocational pursuits are essential.

III. RECORDS OF PREVIOUS MEDICAL CARE. If not previously furnished to the FAA, a copy of pertinent hospital records as well as out-patient treatment records, with clinical data, x-ray and laboratory observations and copies of or original serial EKG tracings, should be provided. Detailed reports of surgical procedures as well as cerebral and coronary arteriography and other major diagnostic studies are of prime importance.

IV. GENERAL PHYSICAL EXAMINATION. A brief description of any comment-worthy personal characteristics; height, weight, representative blood pressure readings in both arms; funduscopic examination of retinal arteries; condition of peripheral arteries; carotid artery auscultation; heart size; rate, rhythm and description of murmurs (location, intensity, timing, and opinion as to significance) and other findings of consequence must be provided.

V. LABORATORY DATA. As a minimum, must include actual test values of:

A. Routine urinalysis and complete blood count.

B. Blood chemistries (values and normal ranges of the laboratory).

FAA Form 8500-19 (3-77) Supersedes Previous Edition

(OVER)

1. Serum cholesterol and triglycerides after 12- to 16-hour fast.

2. Blood uric acid after 12- to 16-hour fast.

3. Fasting blood sugar. If the fasting blood sugar is elevated, include at least a three-hour glucose tolerance test following glucose loading for the three preceding days.

4. Blood urea nitrogen.

5. Protein-bound iodine, if indicated, and reports of any other diagnostic studies which may have been recently performed.

C. Recent PA and lateral chest x-rays (provide films if abnormal).

D. Electrocardiograms.

1. Resting tracing.

2. Exercise stress test.

a. State methodology used.

b. Provide blood pressure determinations at rest, at each stage of the exercise stress test, and during the recovery period.

c. Submit representative EKG tracings for the control, exercise and recovery periods.

d. Obtain recovery EKG tracings until there is a return to the control configuration and/or until the control level of heart rate has been achieved.

NOTE: The information obtained through a determination of current cardiovascular capacity and an evaluation of strain end points under the stress of rhythmic exercise is considered essential to the determination of fitness of any applicant with suspected or known cardiovascular disease. Current practice indicates that a stress test on a treadmill, using either Bruce or Balke protocol, is optimum in providing the desired performance data. Alternatively, an ergometer test that results in a degree of work of approximately 85 percent of the age-predicted maximum capacity using heart rate end points is acceptable. All usual medical precautions should be followed in prescreening, election to test, testing, and follow-up on applicants who undergo exercise stress testing. The resting tracing should be reviewed by the examining physician for evidence of acute coronary insufficiency, recent myocardial infarction, or repolarization abnormalities. EKG evidence of recent, unsuspected myocardial change or infarction would contraindicate exercise testing. Please state reasons if the exercise stress test is medically contraindicated.

☆U.S. G.P.O. 1977-725-165/514

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

OMB Approval
Not Required

AUTHORIZATION FOR THE RELEASE OF MEDICAL INFORMATION TO THE FEDERAL AVIATION ADMINISTRATION

TO WHOM IT MAY CONCERN:

I, ______ (First) ______ (Middle) ______ (Last)

born on ______ (Month) ______ (Day), ______ (Year) at ______ (City),

______ (State or Country), presently residing at ______ (Current residence address), ______ (City), ______ (State), ______ (Zip Code),

hereby authorize any physician or other person who has attended, examined or treated me, or any clinic, hospital, institution, company, or Federal, State or municipal agency, office or bureau which may have information concerning my medical history, to release to the Administrator of the Federal Aviation Administration, or his medical representative, any available information or records concerning my medical history in their knowledge or possession.

This authorization is given pursuant to Section 67.31 of Part 67 of the Federal Aviation Regulations to provide additional information necessary to determine whether I meet the applicable medical standards for an airman medical certificate I hold or for which I have made application.

I have also been known by the following name(s): ______

______ *(If none, state "None")*

A reproduction of this authorization shall be deemed as effective and valid as the original.

(Signature) ______

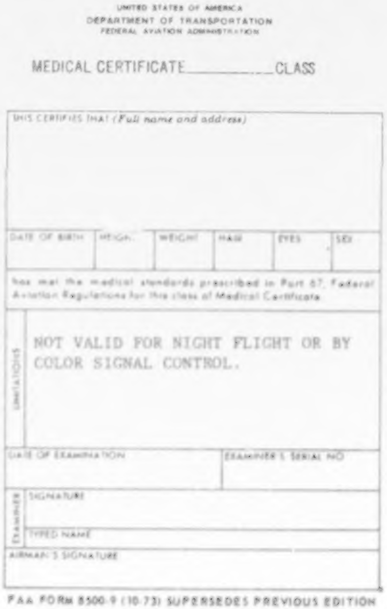
(Date) ______

FAA Form 8500-21 (5-76) SUPERSEDES PREVIOUS EDITION

☆ U.S. GOVERNMENT PRINTING OFFICE 1977 771-021

STANDARD VISION LIMITATIONS *

The following contains FAA's standard terminology to be used, when applicable, on the airman medical certificate. This terminology may not be changed or modified.



UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

MEDICAL CERTIFICATE __________ CLASS

THIS CERTIFIES THAT *(Full name and address)*

DATE OF BIRTH	HEIGHT	WEIGHT	HAIR	EYES	SEX

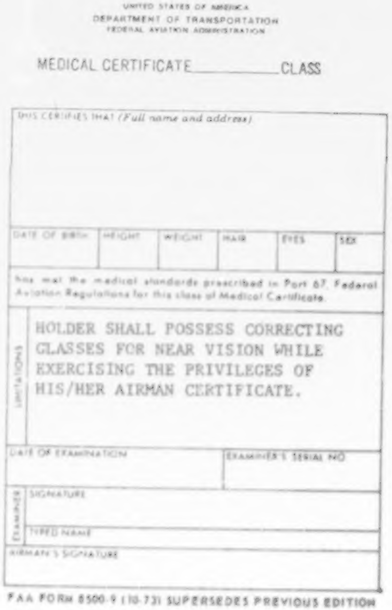
has met the medical standards prescribed in Part 67, Federal Aviation Regulations for this class of Medical Certificate

LIMITATIONS: NOT VALID FOR NIGHT FLIGHT OR BY COLOR SIGNAL CONTROL.

DATE OF EXAMINATION
EXAMINER'S SERIAL NO
EXAMINER: SIGNATURE
TYPED NAME
AIRMAN'S SIGNATURE

FAA FORM 8500-9 (10-73) SUPERSEDES PREVIOUS EDITION

Deficient Color Vision



UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

MEDICAL CERTIFICATE __________ CLASS

THIS CERTIFIES THAT *(Full name and address)*

DATE OF BIRTH	HEIGHT	WEIGHT	HAIR	EYES	SEX

has met the medical standards prescribed in Part 67, Federal Aviation Regulations for this class of Medical Certificate

LIMITATIONS: HOLDER SHALL POSSESS CORRECTING GLASSES FOR NEAR VISION WHILE EXERCISING THE PRIVILEGES OF HIS/HER AIRMAN CERTIFICATE.

DATE OF EXAMINATION
EXAMINER'S SERIAL NO
EXAMINER: SIGNATURE
TYPED NAME
AIRMAN'S SIGNATURE

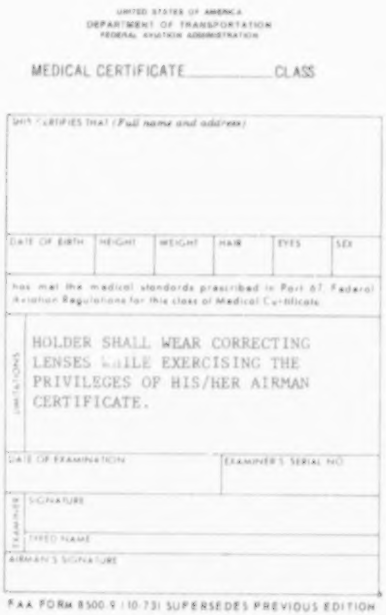
FAA FORM 8500-9 (10-73) SUPERSEDES PREVIOUS EDITION

Defective Near Vision

* NO OTHER LIMITATIONS MAY BE PLACED ON THE MEDICAL CERTIFICATE BY THE EXAMINER.

STANDARD VISION LIMITATIONS *

The following contains FAA's standard terminology to be used, when applicable, on the airman medical certificate. This terminology may not be changed or modified.



UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

MEDICAL CERTIFICATE ____________ CLASS

THIS CERTIFIES THAT *(Full name and address)*

DATE OF BIRTH	HEIGHT	WEIGHT	HAIR	EYES	SEX

has met the medical standards prescribed in Part 67, Federal Aviation Regulations for this class of Medical Certificate

LIMITATIONS: HOLDER SHALL WEAR CORRECTING LENSES WHILE EXERCISING THE PRIVILEGES OF HIS/HER AIRMAN CERTIFICATE.

DATE OF EXAMINATION	EXAMINER'S SERIAL NO.

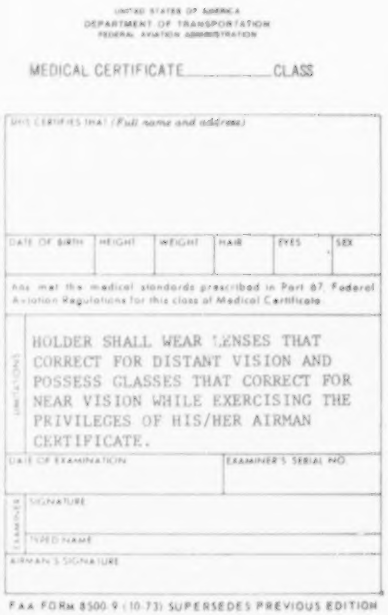
EXAMINER: SIGNATURE

TYPED NAME

AIRMAN'S SIGNATURE

FAA FORM 8500-9 (10-73) SUPERSEDES PREVIOUS EDITION

Defective Distant Vision



UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

MEDICAL CERTIFICATE ____________ CLASS

THIS CERTIFIES THAT *(Full name and address)*

DATE OF BIRTH	HEIGHT	WEIGHT	HAIR	EYES	SEX

has met the medical standards prescribed in Part 67, Federal Aviation Regulations for this class of Medical Certificate

LIMITATIONS: HOLDER SHALL WEAR LENSES THAT CORRECT FOR DISTANT VISION AND POSSESS GLASSES THAT CORRECT FOR NEAR VISION WHILE EXERCISING THE PRIVILEGES OF HIS/HER AIRMAN CERTIFICATE.

DATE OF EXAMINATION	EXAMINER'S SERIAL NO.

EXAMINER: SIGNATURE

TYPED NAME

AIRMAN'S SIGNATURE

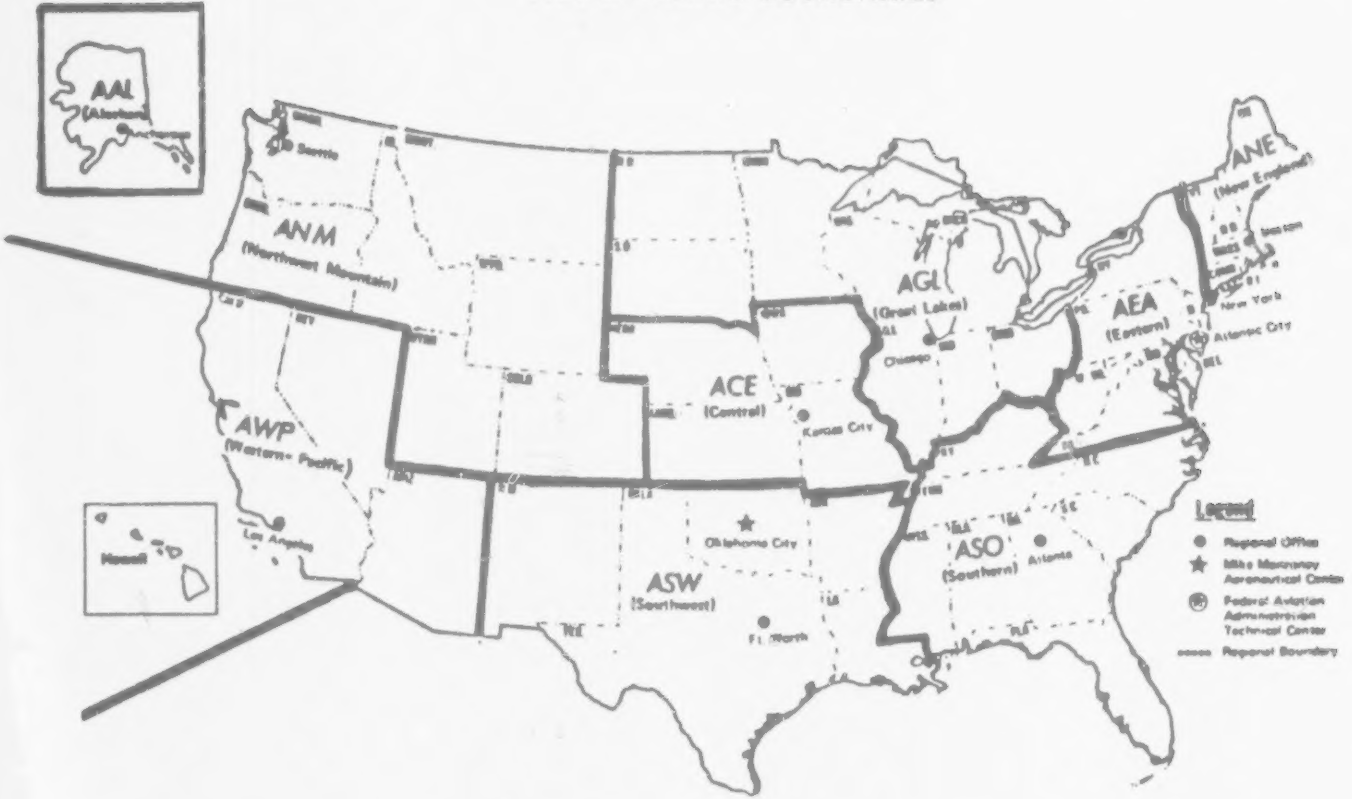
FAA FORM 8500-9 (10-73) SUPERSEDES PREVIOUS EDITION

Combined Defective Distant and Near Vision

* NO OTHER LIMITATIONS MAY BE PLACED ON THE MEDICAL CERTIFICATE BY THE EXAMINER.

Appendix 3

FAA REGIONAL BOUNDARIES


AAL (Alaskan)
Anchorage
ANM (Northwest Mountain)
Seattle
AWP (Western-Pacific)
Los Angeles
Hawaii
ACE (Central)
Kansas City
ASW (Southwest)
Oklahoma City
Ft. Worth
AGL (Great Lakes)
Chicago
ASO (Southern)
Atlanta
AEA (Eastern)
New York
Atlantic City
ANE (New England)
Boston
Legend
● Regional Office
★ Mike Monroney Aeronautical Center
Federal Aviation Administration Technical Center
Regional Boundary

FEDERAL AVIATION ADMINISTRATION REGIONS AND REGIONAL/CENTER OFFICE ADDRESSES

ALASKAN REGION - Alaska

Regional Flight Surgeon, AAL-300
Federal Aviation Administration
P. O. Box 14
701 C Street
Anchorage, Alaska 99513
Phone: (907) 271-5431

CENTRAL REGION - Iowa, Kansas, Missouri, Nebraska

Regional Flight Surgeon, ACE-300
Federal Aviation Administration
Federal Building
601 East 12th Street
Kansas City, Missouri 64106
Phone: (816) 374-5096

Asst. Regional Flight Surgeon
Federal Aviation Administration
Olathe ARTCC
1801 East Loula
Olathe, Kansas 66061
Phone: (913) 782-5300, Ext. 237

EASTERN REGION - Delaware, District of Columbia, Maryland, New Jersey, New York, Pennsylvania, Virginia, West Virginia

Regional Flight Surgeon, AEA-300
Federal Aviation Administration
Federal Building
JFK International Airport
Jamaica, New York 11430
Phone: (212) 995-3742

Asst. Regional Flight Surgeon
Federal Aviation Administration
Washington ARTCC
Intersection Route 7 & 654
Leesburg, Virginia 22075
Phone: (703) 777-4400, Ext. 259

Asst. Regional Flight Surgeon
Federal Aviation Administration
New York ARTCC
Long Island MacArthur Airport
Ronkonkoma, New York 11779
Phone: (516) 737-3546

GREAT LAKES REGION - Illinois, Indiana, Minnesota, Michigan, Ohio, Wisconsin, North Dakota, South Dakota

Regional Flight Surgeon, AGL-300
Federal Aviation Administration
2300 East Devon Avenue
Des Plaines, Illinois 60018
Phone: (312) 694-7491

Asst. Regional Flight Surgeon
Federal Aviation Administration
Chicago ARTCC
619 Indian Trail Road
Aurora, Illinois 60507
Phone: (312) 242-4829, Ext. 302

Asst. Regional Flight Surgeon
Federal Aviation Administration
Cleveland ARTCC
326 East Lorain Street
Oberlin, Ohio 44074
Phone: (216) 774-1071

Asst. Regional Flight Surgeon
Federal Aviation Administration
Indianapolis ARTCC
2000 Bauman Road
Indianapolis, Indiana 46241
Phone: (317) 247-2239, Ext. 267

Asst. Regional Flight Surgeon
Federal Aviation Administration
Minneapolis ARTCC
512 Division Street
Farmington, Minnesota 55024
Phone: (612) 463-3370, Ext. 196

NEW ENGLAND REGION - Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont

Regional Flight Surgeon, ANE-300
Federal Aviation Administration
12 New England Executive Park
Burlington, Massachusetts 01803
Phone: (617) 273-7307

Asst. Regional Flight Surgeon
Federal Aviation Administration
Boston ARTCC
Northeastern Blvd. & Harris Road
Nashua, New Hampshire 03060
Phone: (603) 889-2148

NORTHWEST MOUNTAIN REGION - Idaho, Oregon, Washington, Colorado, Montana, Utah, Wyoming

Regional Flight Surgeon, ANM-300
Federal Aviation Administration
FAA Building, Boeing Field
Seattle, Washington 98108
Phone: (206) 767-2710

Asst. Regional Flight Surgeon
Federal Aviation Administration
Seattle ARTCC
3101 Auburn Way South
Auburn, Washington 98002
Phone: (206) 767-2540

Regional Flight Surgeon
Federal Aviation Administration
10455 East 25th Avenue
Aurora, Colorado 80010
Phone: (303) 837-3824

Asst. Regional Flight Surgeon
Federal Aviation Administration
Denver ARTCC
2211 17th Avenue
Longmont, Colorado 80501
Phone: (303) 776-8108

Asst. Regional Flight Surgeon
Federal Aviation Administration
Salt Lake City ARTCC
2150 West 700 North
Salt Lake City, Utah 84116

SOUTHERN REGION - Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico, Virgin Islands

Regional Flight Surgeon, ASO-300
Federal Aviation Administration
P. O. Box 20636
Atlanta, Georgia 30320
Phone: (404) 763-7251

Asst. Regional Flight Surgeon
Federal Aviation Administration
Atlanta ARTCC
299 Woolsey Road
Hampton, Georgia 30228
Phone: (404) 946-3511, Ext. 312

Asst. Regional Flight Surgeon
Federal Aviation Administration
Memphis ARTCC
322 Democrat Road
Memphis, Tennessee 38118
Phone: (901) 365-0900, Ext. 270

Asst. Regional Flight Surgeon
Federal Aviation Administration
Jacksonville ARTCC
P. O. Box 98
Hilliard, Florida 32046
Phone: (904) 845-3311, Ext. 312

Asst. Regional Flight Surgeon
Federal Aviation Administration
Miami ARTCC
7500 NW 58th St. & Palmetto Expressway
Miami, Florida 33166
Phone: (305) 592-9770, Ext. 304

SOUTHWEST REGION - Arkansas,
Louisiana, New Mexico, Oklahoma, Texas

Regional Flight Surgeon, ASW-300
Federal Aviation Administration
P. O. Box 1689
Fort Worth, Texas 76101
Phone: (817) 624-4287

Asst. Regional Flight Surgeon
Federal Aviation Administration
Albuquerque ARTCC
6900 Los Angeles Drive, NE
Albuquerque, New Mexico 87113
Phone: (505) 296-0213

Asst. Regional Flight Surgeon
Federal Aviation Administration
Houston ARTCC
P. O. Box 60308
Houston, Texas 77060
Phone: (713) 443-8641, Ext. 296

WESTERN-PACIFIC REGION - Arizona,
California, Nevada, Hawaii

Regional Flight Surgeon, AWP-300
Federal Aviation Administration
P. O. Box 92027
Worldway Postal Center
Los Angeles, California 90009
Phone: (213) 536-6300

Asst. Regional Flight Surgeon
Federal Aviation Administration
Los Angeles ARTCC
2555 East Avenue P
Palmdale, California 92550
Phone: (805) 947-4101, Ext. 220

Asst. Regional Flight Surgeon
Federal Aviation Administration
Oakland ARTCC
5125 Central Avenue
Fremont, California 94536
Phone: (415) 797-6394

Asst. Regional Flight Surgeon
Federal Aviation Administration
P. O. Box 10310
Honolulu, Hawaii 96816
Phone: (808) 734-6693

ORDER DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

8520.2C

June 6, 1978

SUBJ: AVIATION MEDICAL EXAMINER SYSTEM

1. PURPOSE. This order provides guidelines for the administration of the Aviation Medical Examiner System including procedures for the designation, renewal of designation, and termination of designation of Aviation Medical Examiners (AMEs).

2. DISTRIBUTION. This order is distributed to division level in the Offices of Aviation Medicine, Chief Counsel, and Investigations and Security; to Region Aviation Medical Divisions; to branch level in the Civil Aeromedical Institute; to NAFEC Medical Staff; to medical offices in ARTCCs; and to designated Aviation Medical Examiners.

3. CANCELLATION. Order 8520.2B, Aviation Medical Examiner System, dated March 11, 1977, is canceled.

4. EXPLANATION OF CHANGES.

a. The description of qualifications for AME designation has been revised to emphasize the requirement for suitability in professional and personal conduct.

b. The facilities and equipment list has been revised to require an appropriate eye lane where standard Snellen Test Types are used for testing of visual acuity, to require a standard light source where pseudoisochromatic plates are used for color vision testing, and to describe the audiometer required for AMEs performing first-class examinations.

c. Criteria for redesignation have been modified to allow submission, when required, of references from local practicing physicians as an alternative to a statement of membership in medical societies or associations.

d. References to FAA Order 1600.25 have been revised to reflect its most recent change.

e. The paragraph on form availability has been updated.

f. The need for protection of FAA forms has been stated.

g. Minor non-substantive word changes have been made for form or to correct typographical errors.

Distribution: WAM/GC/SE-2
RNAM-2; CAM-3
FAT-1 (Minimum)

Initiated By: AAM-200

5. GENERAL. Aviation Medical Examiners, as representatives of the agency, assume certain responsibilities directly related to the agency's safety program. They serve in their communities as the Federal government's aviation safety representatives where medical matters are concerned. They have public responsibility to insure that only those applicants physically and mentally able to perform safely are permitted to exercise the privileges of airman certificates. In order to properly discharge the duties associated with these responsibilities, Aviation Medical Examiners must maintain familiarity with general medical knowledge applicable to aviation. They also must have detailed knowledge and understanding of agency rules, regulations, policies and procedures related to the medical certification of airmen and must possess acceptable equipment and adequate facilities necessary to carry out the prescribed examinations.

6. POLICY. In the selection and retention of examiners, it is agency policy to designate only professionally qualified, practicing physicians who have an expressed interest in promoting aviation safety. Only those physicians who enjoy the fullest respect of their associates and members of the public whom they serve shall be designated and retained as AMEs.

7. DEFINITIONS.

a. Aviation Medical Examiner. A physician who is designated to accept applications for physical examinations necessary for issuing medical certificates under Part 67 of the Federal Aviation Regulations, to conduct those physical examinations, to issue or deny medical certificates in accordance with Part 67, to issue student pilot certificates as specified in Part 61 of the regulations, and, as requested, to participate in investigating aircraft accidents.

b. Senior Aviation Medical Examiner. An Aviation Medical Examiner who is specifically designated to give the examinations for first-class medical certificates and to issue or deny first-class certificates in accordance with Part 67 of the Federal Aviation Regulations.

c. Physician. A Doctor of Medicine or Doctor of Osteopathy.

8. DELEGATION OF AUTHORITY. The Office of Aviation Medicine is the principal staff element of the agency with respect to the Aviation Medical Examiner System. As the head of the Office, the Federal Air Surgeon develops and establishes policies, plans, procedures, standards and regulations governing the Aviation Medical Examiner System.

a. The Chief, Civil Aeromedical Institute, as assisted by the Chief, Aeromedical Certification Branch (AAC-130), and the Chief, Aeromedical Education Branch (AAC-140), is delegated authority to administer the AME System and to:

(1) Designate and redesignate Senior Flight Surgeons of the armed forces on specified military posts, stations, and facilities as AMEs in coordination with the Surgeons General of the armed forces. Military designations are subject to procedures developed by the Chief, Civil Aeromedical Institute, and not the guidelines set out in this Order. Military AMEs shall be designated to perform second- and third-class examinations only. This authority may be redelegated to the Chief, Aeromedical Certification Branch, or to the Chief Aeromedical Education Branch.

(2) Designate and redesignate physicians as AMEs (including Senior AMEs) who are located in foreign countries or areas not under the responsibility of a Regional Flight Surgeon. This authority may be redelegated to the Chief, Aeromedical Certification Branch.

b. Regional Flight Surgeons are delegated authority to designate and redesignate physicians as AMEs (including Senior AMEs) located within their geographical areas of responsibility.

9. DESIGNATION CRITERIA.

a. Authority to Perform Second- and Third--Class Examinations.

(1) Qualifications. The applicant for designation as an AME with authority to perform examinations for second- or third-class medical certificates and student pilot certificates must be a professionally qualified physician in good community standing, licensed to practice medicine in the state, foreign country, or area in which the designation is sought and must be engaged in full-time practice at a specified address. The applicant's past professional performance and personal conduct must have demonstrated suitability for a position of responsibility and trust. Special consideration will be given to those applicants who are pilots, who have been military flight surgeons, or who have special training or expertise in aviation medicine.

(2) Distribution. There must be a determined need for an AME in the area, based on adequacy of coverage related to pilot population.

(3) Agreements. To become a designated AME, the applicant shall be required to agree to comply with the following conditions:

(a) Professionalism. To be informed as to progress in aviation medicine, to be thoroughly familiar with instructions as to technique of examination, medical assessment, and certification of examinees, and to abide by the policies, rules, and regulations of the FAA.

(b) Examinations. To personally conduct all medical examinations at an established office address. As an exception to this policy, other physicians may perform specialized parts of the examinations under the general supervision of the AME. In all cases, the AME shall review, certify, and assume responsibility for the accuracy and completeness of the total report of examination, and the cost to the applicant may not exceed the amount normally charged for a complete examination by a single examiner. Other exceptions to this policy may be made only by the appropriate Regional Flight Surgeon, the Chief, Civil Aeromedical Institute, or the Federal Air Surgeon. All exceptions made by field personnel shall be promptly reported to the Federal Air Surgeon.

(c) Seminars. To attend a FAA sponsored Aviation Medicine Seminar within one year following initial appointment and within each five year interval thereafter. Travel costs and other expenses for the AME to attend the seminars shall be paid for by the AME.

(d) Office Address and Telephone Numbers. To promptly advise the responsible Regional Flight Surgeon or the Chief, Civil Aeromedical Institute, if appropriate, of any change in office mailing address or telephone numbers. These changes shall be reported by the Regional Flight Surgeon or the Chief, Civil Aeromedical Institute, as appropriate, to the Chief, Aeromedical Education Branch.

(e) Facilities and Equipment. The applicant must have adequate facilities for performing the required examinations and possess or agree to obtain the following equipment:

(1) Standard Snellen Test Types for visual acuity (both near and distant), and an appropriate eye lane.

(2) Eye Muscle Test Light. May be a spot of light 0.5cm in diameter, a regular muscle-test light, or an ophthalmoscope head.

(3) Maddox Rod. May be hand type.

(4) Horizontal Prism Bar. Risley, Hughes, or hand prism are acceptable alternatives.

(5) Color Vision Test Apparatus. Pseudoisochromatic plates (Dvorine, 2nd Edition; AOC Revised Edition or AOC:HRR: Ishihara, 16, 24, or 38 Plate Editions); and Macbeth Daylight Lamp, Easel Lamp, or color preception light as specified in the plate book. Acceptable substitutes: Farnsworth Lantern; SAMCTT (School of Aviation Medicine Color Threshold Tester); Eldridge-Green Color Perception Lantern; Titmus Optical Vision Tester; Keystone Orthoscope; Keystone Telebinocular.

(6) A Wall Target consisting of a 50-inch square surface with a matte finish (may be black felt or dull finish paper), and a 2-mm white test object (may be a pin), in a suitable handle of the same color as the background).

(7) Other vision test equipment that is acceptable as a replacement for (e)(1) through (4) above includes the American Optical Company Site-Screener, Bausch and Lomb Orthorator, Keystone Orthoscope or Telebinocular, and Titmus Vision Tester.

(8) Other equipment includes standard physician diagnostic instruments and aids including those necessary to perform urine testing. Those physicians who are designated to perform first-class examinations also must have electrocardiographic equipment and a standard pure tone audiometer. An acceptable audiometer is one that is calibrated to American Standards Association (ASA) - 1951, American National Standards Institute (ANSI) - 1951, or International Standards Organization (ISO) standards and is capable of determining, within 5 decibels (dB) from audiometer 0 to 60 dB, the examinee's thresholds to pure tones at 500, 1000, 2000, and 4000 hertz (Hz).

b. Authority to Perform First-Class Examinations. In addition to the designation criteria set out in paragraph 9.a., criteria for designation for the purpose of giving examinations for first-class medical certificates are as follows:

(1) Three years acceptable performance as an AME authorized to perform second- and third-class examinations.

(2) Need for an AME designated to perform first-class examinations in the area, based on adequacy of coverage related to pilot population.

10. PROHIBITED EXAMINATIONS. An AME is not authorized to perform a self-examination for issuance of a medical certificate nor to issue a medical certificate to him or herself.

11. TENURE OF DESIGNATION. Designations of physicians as AMEs are effective for one year after the date they are issued unless terminated earlier by the agency or the designee. Redesignations shall be made annually. In the event of office relocation or change in practice, a designation shall terminate and redesignation must be requested of the responsible Regional Flight Surgeon or, if appropriate, the Chief, Civil Aeromedical Institute. Relocation is defined as a change in location of more than 50 miles from the address at the time of original designation or a move across state, national or regional boundaries.

12. PRIVILEGES OF DESIGNATION. An AME may:

a. Accept applications for physical examinations necessary for issuing medical certificates under Part 67 of the Federal Aviation Regulations.

b. Conduct those physical examinations under the general supervision of the appropriate agency official.

c. Issue or deny medical certificates in accordance with Part 67 of the Federal Aviation Regulations, subject to reconsideration by the responsible agency official.

d. Issue or deny combined Airman Medical and Student Pilot Certificates.

e. Participate in investigating aircraft accidents as requested.

13. PROCEDURES FOR DESIGNATION.

a. Initial Designation.

(1) Application.

(a) Authority to perform second- and third-class examinations only. Physicians who request authority to perform second- and third-class examinations only shall be required to complete FAA Form 8520-2 (Aviation Medical Examiner Designation Application) and submit the original and one copy to the appropriate Regional Flight Surgeon or to the Chief, Civil Aeromedical Institute, if located in a foreign country or other area not under the jurisdiction of a Regional Flight Surgeon.

(b) Authority to perform first-class examinations. Physicians who request authority to perform first-class examinations as well as second- and third-class examinations shall be required to submit their requests in writing to the appropriate Regional Flight Surgeon, or to the Chief, Civil Aeromedical Institute, if located in a foreign country or other areas not under the jurisdiction of a Regional Flight Surgeon.

(2) Notification. The Regional Flight Surgeon or the Chief, Civil Aeromedical Institute, as appropriate, shall advise the applicant in writing whether he or she has been designated. If designated, the physician shall be sent an appropriately worded FAA Form 8000-5, Certificate of Designation, and the forms and supplies outlined in paragraph 13.a.(3) of this order. Designating officials shall notify

the Chief, Aeromedical Education Branch (AAC-140), of each designation. Upon receipt of notification, the Chief, Aeromedical Education Branch, shall prepare and send to each designee an appropriately worded FAA Form 8520-4, Aviation Medical Examiner Identification Card. Identification cards shall expire one year after the date they are issued.

(3) Forms and Supplies. The following shall be furnished each designee upon initial designation:

(a) Part 67 of the Federal Aviation Regulations.

(b) Order 8520.3A, Guide for Aviation Medical Examiners.

* (c) Order 8025.1A, Medical Investigation of Aircraft Accidents (at option of Regional Flight Surgeon).

(d) Self-addressed envelopes for the Aeromedical Certification Branch and the appropriate Regional Aviation Medical Division.

(e) Order 8520.2C, Aviation Medical Examiner System

(f) Directory of AMEs.

(g) A supply of the following FAA Forms and Stationery:

* 8025-2	Aircraft Accident Medical Information (at option of Regional Flight Surgeon)
8500-1	Near Vision Acuity (Test Card)
8500-2	AME Letter of Denial
8500-7	Report of Eye Evaluation
8500-8	Application for Airman Medical Certificate or Airman Medical and Student Pilot Certificate
8500-11	Medical Forms and Stationery Requisition
8500-12	Instructions for Completion of Application for Airman Medical Certificate or Airman Medical and Student Pilot Certificate, FAA Form 8500-8
8500-14	Ophthalmological Evaluation of Glaucoma
8500-17	Specifications for Initial Evaluation Abnormal Carbohydrate Metabolism
8500-18	Specifications for Followup Evaluation Abnormal Carbohydrate Metabolism
8500-19	Cardiovascular Evaluation Specifications
8500-21	Authorization for the Release of Medical Information to the FAA

The airman medical certificate, FAA Form 8500-9, which is attached to FAA Form 8500-8 is sensitive in that its use by an unauthorized individual could have a detrimental effect on air safety. Accordingly, these forms should be afforded a reasonable degree of protection and any loss should be reported immediately to the Regional Flight Surgeon.

b. Redesignation or Termination of Designation.

(1) Evaluation. It is the policy of the Federal Aviation Administration to continuously evaluate the performance of each AME. The Chief, Aeromedical Education Branch, under the direction of the Chief, Civil Aeromedical Institute, is responsible for developing and administering evaluation procedures for the purpose of supplying Regional Flight Surgeons and the Chief, Civil Aeromedical Institute, with data to assist them in redesignation of only those physicians who have demonstrated satisfactory performance in the past and who continue to show a definite interest in the AME program. In addition, the Chief, Aeromedical CertificationBranch, in conjunction with daily certification duties, shall identify those AMEs committing serious certification errors and notify the appropriate Regional Flight Surgeon or, as required, the Chief, Civil Aeromedical Institute on a case-by-case basis so that appropriate action may be taken regarding the AME. AME evaluation includes the following:

(a) Adequacy of Information on reports of medical examination (FAA Form 8500-8)

(b) Error rate in certification of airmen.

(c) AME interest and participation in the total program and availability for aircraft accident investigation.

(d) Reports from aviation community concerning the AME's professional performance and personal conduct as it may reflect on the agency.

(e) Information from medical societies and associations.

(f) Attendance at seminars in accordance with paragraph 9.a.(3)(c).

(2) AME Performance Reports. For purpose of accomplishing the evaluation, the Regional Flight Surgeons and the Chief, Civil Aeromedical Institute, shall be furnished the following reports:

(a) AME Performance Summary (Quarterly) (RIS: AM 9320-3) of AMEs eligible for redesignation. The report shall include but is not limited to number of examinations, by class; number of errors; and medical certification cases denied or pending.

(b) AME Training Summary (RIS: AC 8520-6) which shall include a listing of each AME with dates of attendance at seminars, type of designation (to perform first-class examinations or to perform only second-and third-class examinations), interest in the Accident Investigation Program, and whether the AME is a pilot.

(c) AME Performance Summary (Annually) (RIS: AM 9320-4) on a calendar year basis, which shall include, but is not limited to, the same information listed in (2)(a) above.

(d) Summary Comparison Report (RIS: AM 9320-2), on a calendar year basis. This report shall identify the number of physical examinations performed in each state and county as contrasted with the number of persons requiring medical certification in each state and county, by airman category.

(3) Criteria for Redesignation or Termination of Designation.

(a) Performance. Suitability for redesignation shall be determined in part by review of all available information related to factors outlined in paragraph 13.b of this order.

(b) Need. Redesignation shall be dependent upon a continuing need in the area based principally upon the AME/pilot ratio and/or number of examinations performed by the AME. Failure to perform a significant number of examinations during any 12-month period may be considered reason for not redesignating. If the type or location of an AME's practice changes, a new determination of need shall be made by the responsible Regional Flight Surgeon or the Chief, Civil Aeromedical Institute, as appropraie. New personal references or statements from the AME's local or state medical society or osteopathic association (as provided for upon initial designation in FAA Form 8520-2) that the physician is a member in good standing may be required as appropriate.

(c) Personal Conduct. Arrest, indictment, or conviction for violation of a law or personal conduct that reflects adversely on the agency may be considered grounds to refuse to redesignate or to terminate a designation. If an AME's personal or professional conduct tends to bring discredit upon the Federal Aviation Administration and/or compromises the effectiveness of the designation, the Regional Flight Surgeon or the Chief, Civil Aeromedical Institute, as appropriate, shall evaluate the circumstances and determine whether there is sufficient cause to refuse to redesignate or, if necessary, to terminate designation. As required, the appropriate Air Transportation Security Division shall be requested to investigate and furnish necessary documentation.

(d) Health. If an AME has an illness or medical condition that may affect sound professional judgment or ability to perform examinations, redesignation shall be refused or designation shall be terminated.

(e) Voluntary Termination. Upon request by the AME, designation shall not be renewed or shall be terminated.

(f) Other Reasons. If, for any other reason, the responsible Regional Flight Surgeon or Chief, Civil Aeromedical Institute, as appropriate, finds it is in the best interest of the agency not to redesignate an AME or to terminate a designation, the appropriate action shall be taken.

(4) Procedures.

(a) Redesignation. Sixty (60) days prior to a designation anniversary date, the Aeromedical Education Branch shall forward FAA Form 8520-4, Aviation Medical Examiner Identification Card, to AMEs who meet redesignation criteria as certified by either a Regional Flight Surgeon or the Chief, Civil Aeromedical Institute. If redesignation is desired, the physician shall detach, sign, and retain the Identification Card portion, and complete the remainder of the form and return it to the Chief, Aeromedical Education Branch (AAC-140). Physicians who do not wish to be redesignated shall return the complete Form 8520-4 to AAC-140 so that their names may be removed from the roll of designated Aviation Medical Examiners. Physicians who fail to return the completed form to AAC-140 within a reasonable time shall be considered as not desiring redesignation, and upon notification to the physician, the name shall be removed from the rolls. AAC-140 shall notify the responsible Regional Flight Surgeon and the Chief, Civil Aeromedical Institute, of those physicians who decline redesignation.

(b) Non-Redesignation or Termination of Designation.

(1) Professional and/or Administrative Performance. If the responsible Regional Flight Surgeon or the Chief, Civil Aeromedical Institute, determines that an AME is performing in a professionally substandard manner, or has failed to follow established FAA rules, regulations, policies, or procedures, the AME shall be notified of these deficiencies and advised of need for improvement. Where possible, a visit with the AME may be indicated. Appropriate records regarding

notification and contact shall be maintained. After a reasonable period of time, the Regional Flight Surgeon or Chief, Civil Aeromedical Institute, as appropriate, shall again review the AME's performance to determine if sufficient improvement has been made. If performance is still substandard, the AME will not be redesignated or, if appropriate, procedures for termination of designation shall be initiated.

(2) Non-Redesignation. If the Regional Flight Surgeon or Chief, Civil Aeromedical Institute, as appropriate, determines that an AME should not be redesignated, the AME shall be notified in writing of the reason for the action. A copy of the notification shall be sent to Chief, Aeromedical Education Branch, AAC-140.

(3) Termination of Designation. If the Regional Flight Surgeon or Chief, Civil Aeromedical Institute, as appropriate, determines that termination during the designation year is warranted, documentation shall be provided to AAC-140 where a letter terminating the AME's designation shall be prepared for the signature of the Federal Air Surgeon and forwarded to the Chief, Aeromedical Standards Division. Upon concurrence by the Chief, Aeromedical Standards Division, the draft letter shall be presented to the Federal Air Surgeon for consideration and signature.

(4) Return of Materials. Whether by determination not to redesignate or termination of designation during the designation year, the AME shall be requested to return all agency materials (including Identification Card and Certificate of Designation) to the Chief, Aeromedical Education Branch, AAC-140. The Chief, Aeromedical Education Branch, shall advise the responsible Regional Flight Surgeon or the Chief, Civil Aeromedical Institute, if appropriate, if the materials are not returned within a reasonable period of time so that appropriate action may be taken.

14. AME IDENTIFICATION CARDS. Revised FAA Form 8520-4, Aviation Medical Examiner Identification Card, is prescribed by this order, and supersedes the previous edition.

15. ISSUANCE AND CONTROL OF AME IDENTIFICATION CARDS. The need to assure the integrity of the AME Identification Card system necessitates that strict controls be instituted to prevent fraudulent issuance, improper use, or alteration of this identity card.

a. Responsibility. The Chief, Civil Aeromedical Institute, is responsible for assuring that application forms for the AME Identification Card are properly reviewed and that the issuance and control of these identification cards are accomplished in accordance with the general provisions of FAA Order 1600.25B, FAA Identification Media.

b. Authorizing Officials. To prevent any possible fraudulent issuance of an AME Identification Card, the Chief, Civil Aeromedical Institute, will designate by letter those personnel authorized to sign FAA Form 8520-4 as "Authorizing Official."

c. Protection and Control of AME Identification Media. The acceptance of designation/redesignation portion of revised FAA Form 8520-4, Aviation Medical Examiner Identification Card, shall serve as control for the identification media. The following paragraphs of FAA Order 1600.25B set forth FAA policy with respect to the administrative controls required for an authorized identification system. The appropriate references to FAA Order 1600.25B include:

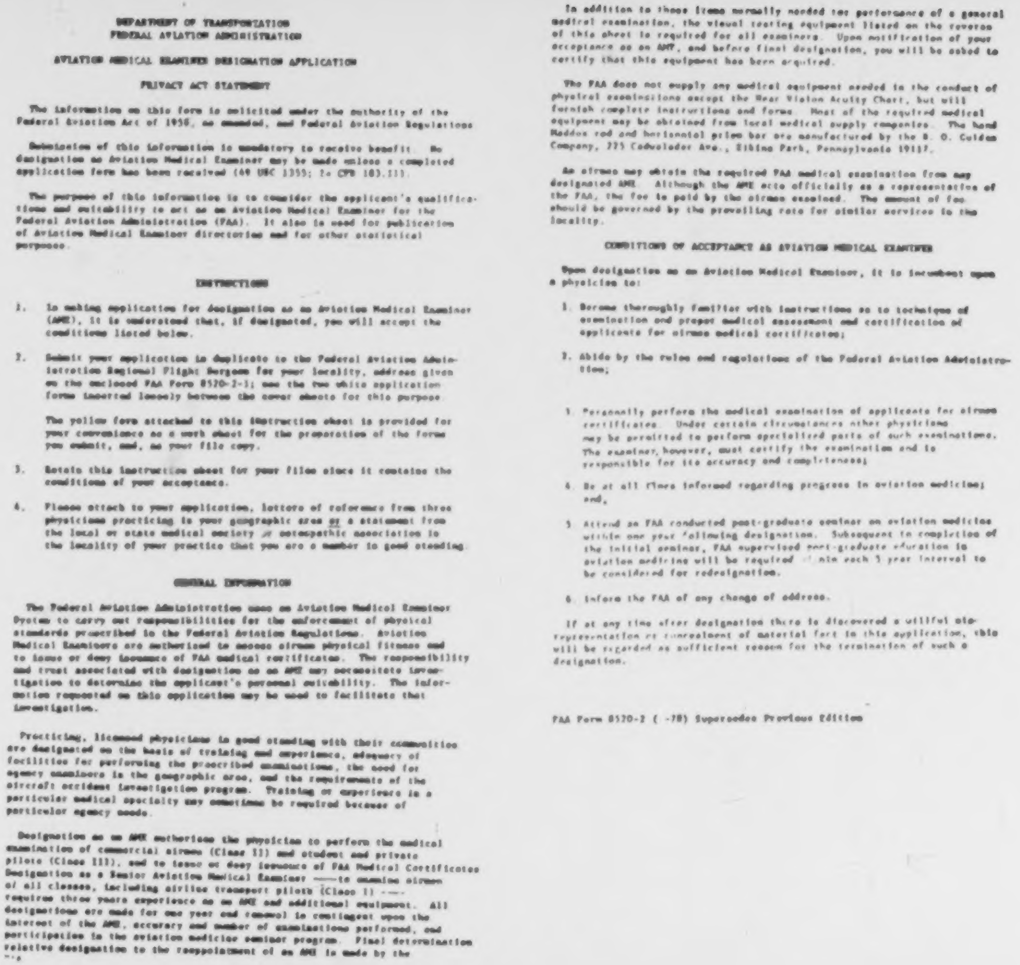
(1) Misuse or alteration (paragraph 22)
(2) Loss or theft (paragraph 23)
(3) Destruction (paragraph 24)
(4) Surrender of ID Media (paragraph 25)
(5) Storage and transmittal (paragraph 26)

16. FORM AVAILABILITY. FAA Form 8520-4 is available only to AAC-140. FAA Form 8520-2 is stocked in FAA Depot and is available to Regional Aviation Medical Divisions and ARTCC Medical Offices through normal supply channels, NSN 0052-00-035-9004, unit of issue: set.

H L Reighard

H. L. REIGHARD, M.D.
Federal Air Surgeon, AAM-1

APPENDIX 1 - SAMPLE APPLICATION FORM



DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

AVIATION MEDICAL EXAMINER DESIGNATION APPLICATION

PRIVACY ACT STATEMENT

The information on this form is solicited under the authority of the Federal Aviation Act of 1958, as amended, and Federal Aviation Regulations

Submission of this information is mandatory to receive benefit. No designation as Aviation Medical Examiner may be made unless a completed application form has been received (49 USC 1355; 14 CFR 183.11).

The purpose of this information is to consider the applicant's qualifications and suitability to act as an Aviation Medical Examiner for the Federal Aviation Administration (FAA). It also is used for publication of Aviation Medical Examiner directories and for other statistical purposes.

INSTRUCTIONS

1. In making application for designation as an Aviation Medical Examiner (AME), it is understood that, if designated, you will accept the conditions listed below.

2. Submit your application in duplicate to the Federal Aviation Administration Regional Flight Surgeon for your locality, address given on the enclosed FAA Form 8520-2-1; use the two white application forms inserted loosely between the cover sheets for this purpose.

   The yellow form attached to this instruction sheet is provided for your convenience as a work sheet for the preparation of the forms you submit, and, as your file copy.

3. Retain this instruction sheet for your files since it contains the conditions of your acceptance.

4. Please attach to your application, letters of reference from three physicians practicing in your geographic area or a statement from the local or state medical society or osteopathic association in the locality of your practice that you are a member in good standing.

GENERAL INFORMATION

The Federal Aviation Administration uses an Aviation Medical Examiner System to carry out responsibilities for the enforcement of physical standards prescribed in the Federal Aviation Regulations. Aviation Medical Examiners are authorized to assess airman physical fitness and to issue or deny issuance of FAA medical certificates. The responsibility and trust associated with designation as an AME may necessitate investigation to determine the applicant's personal suitability. The information requested on this application may be used to facilitate that investigation.

Practicing, licensed physicians in good standing with their communities are designated on the basis of training and experience, adequacy of facilities for performing the prescribed examinations, the need for agency examiners in the geographic area, and the requirements of the aircraft accident investigation program. Training or experience in a particular medical specialty may sometimes be required because of particular agency needs.

Designation as an AME authorizes the physician to perform the medical examination of commercial airmen (Class II) and student and private pilots (Class III), and to issue or deny issuance of FAA Medical Certificates. Designation as a Senior Aviation Medical Examiner ——to examine airmen of all classes, including airline transport pilots (Class I) ——requires three years experience as an AME and additional equipment. All designations are made for one year and renewal is contingent upon the interest of the AME, accuracy and number of examinations performed, and participation in the aviation medicine seminar program. Final determination relative designation to the reappointment of an AME is made by the

In addition to those items normally needed for performance of a general medical examination, the visual testing equipment listed on the reverse of this sheet is required for all examiners. Upon notification of your acceptance as an AME, and before final designation, you will be asked to certify that this equipment has been acquired.

The FAA does not supply any medical equipment needed in the conduct of physical examinations except the Near Vision Acuity Chart, but will furnish complete instructions and forms. Most of the required medical equipment may be obtained from local medical supply companies. The hand Maddox rod and horizontal prism bar are manufactured by the R. O. Gulden Company, 225 Cadwalader Ave., Elkins Park, Pennsylvania 19117.

An airman may obtain the required FAA medical examination from any designated AME. Although the AME acts officially as a representative of the FAA, the fee is paid by the airman examined. The amount of fee should be governed by the prevailing rate for similar services in the locality.

CONDITIONS OF ACCEPTANCE AS AVIATION MEDICAL EXAMINER

Upon designation as an Aviation Medical Examiner, it is incumbent upon a physician to:

1. Become thoroughly familiar with instructions as to technique of examination and proper medical assessment and certification of applicants for airman medical certificates;

2. Abide by the rules and regulations of the Federal Aviation Administration;

3. Personally perform the medical examination of applicants for airman certificates. Under certain circumstances other physicians may be permitted to perform specialized parts of such examinations. The examiner, however, must certify the examination and is responsible for its accuracy and completeness;

4. Be at all times informed regarding progress in aviation medicine; and,

5. Attend an FAA conducted post-graduate seminar on aviation medicine within one year following designation. Subsequent to completion of the initial seminar, FAA supervised post-graduate education in aviation medicine will be required within each 3 year interval to be considered for redesignation.

6. Inform the FAA of any change of address.

If at any time after designation there is discovered a willful misrepresentation or concealment of material fact in this application, this will be regarded as sufficient reason for the termination of such a designation.

FAA Form 8520-2 (-78) Supersedes Previous Edition

APPENDIX 1 - SAMPLE APPLICATION FORM CONT'D

The following is a list of FAA acceptable vision testing equipment as related to Section VII of this form.

Distant Vision

Snellen 20-foot eye chart and eye lane

Acceptable substitutes:

AOC Site-Screener
Bausch & Lomb Orthorator
Keystone Orthoscope
Keystone Telebinocular
Projector with screen
Titmus Optical Vision Tester

Near Vision

FAA Form 8500-1, Near Vision Acuity test card. (This card will be provided at the time of appointment)

Acceptable substitutes:

AOC Site-Screener
Bausch & Lomb Orthorator
Keystone Orthoscope
Keystone Telebinocular
Titmus Optical Vision Tester

Heterophoria

Horizontal prism bar with
graduated prisms beginning with
1 diopter and increasing in power
to at least 8 diopters
and
Red Maddox rod with handle
½ cm. light source, muscle light or
equivalent

Acceptable substitutes:

AOC Site-Screener
Bausch & Lomb Orthorator
Keystone Orthoscope
Keystone Telebinocular
Red Maddox rod and individual prisms
Red Maddox rod and Risley rotary prism
Titmus Optical Vision Tester

Color Vision

Pseudoisochromatic plates (Dvorine, 2nd edition, AOC revised edition or AOC-HRR; Ishihara, 16, 24, or 38 plate editions) and Macbeth Daylight Lamp, Easel Lamp, or color perception testing light as specified in the plate book.

Acceptable substitutes:

Eldridge-Green Color Perception Lantern
Farnsworth Lantern
Keystone Orthoscope
Keystone Telebinocular
SAMCTT (School of Aviation Medicine Color Threshold Tester)
Titmus Optical Vision Tester

Field of Vision

50-inch square black matte surface wall target with center white fixation point, 2 mm. white test objects on black-handled holder.

Acceptable substitute:

Standard perimeter

APPENDIX 1 - SAMPLE APPLICATION FORM CONT'D

(YELLOW)

DEPARTMENT OF TRANSPORTATION – FEDERAL AVIATION ADMINISTRATION
AVIATION MEDICAL EXAMINER DESIGNATION APPLICATION
Print or type legibly – Check box(es) and/or complete items as applicable

Form Approved
OMB No

shaded

FAA USE ONLY
- SERIAL NO.
- STATE/COUNTRY
- COUNTY
- BOARD CODE
- ZIP CODE
- AREA CODE
- WIRE FILE NO.
- DOB
- LICENSE
- ACCIDENT
- YR GRAD.
- SPECIALTY
- PILOT
- FLT. SURG.
- ATR
- DESIG. DATE

SECTION I - APPLICANT IDENTIFICATION

LAST NAME FIRST MIDDLE

DATE OF BIRTH ▶ MONTH / DAY / YEAR

ADDRESS WHERE EXAMINATIONS WILL BE DONE

NAME OF INSTITUTION OR CLINIC, IF ANY

NUMBER AND STREET

CITY COUNTY COUNTRY

STATE ZIP CODE AREA CODE TELE. NO.

WERE YOU EVER DESIGNATED AS AN AVIATION MEDICAL EXAMINER? ☐ YES ☐ NO

IF SO, WHEN: WHERE:

WILL YOU PARTICIPATE IN THE FAA AIRCRAFT ACCIDENT INVESTIGATION PROGRAM? ☐ YES ☐ NO

MEDICAL SPECIALTY
- ☐ FAMILY PRACTICE
- ☐ OPHTHALMOLOGY
- ☐ SURGERY
- ☐ INTERNAL MEDICINE
- ☐ PSYCHIATRY
- ☐ NEUROLOGY
- ☐ INDUSTRIAL MEDICINE
- ☐ AVIATION MEDICINE
- ☐ OTOLARYNGOLOGY
- ☐ OTHER (specify)

LICENSED AS ☐ M.D. ☐ D.O.

STATE	LICENSE NO.

SECTION II - EDUCATION

MEDICAL SCHOOL(S)	NAME OF SCHOOL	CITY, STATE	YR. GRADUATED	DEGREE RECEIVED
INTERNSHIP AND RESIDENCY	NAME OF HOSPITAL / INSTITUTION	CITY, STATE	INCLUSIVE DATES	SPECIALTY or ROTATING
POST GRADUATE	NAME OF INSTITUTION	CITY, STATE	INCLUSIVE DATES	DEGREE or CERTIFICATE

SECTION III - EXPERIENCE

MEDICAL	TYPE OF PRACTICE	NO. OF YRS.	HOSPITAL PRIVILEGES ☐ YES ☐ NO ▶	NAME, LOCATION OF INSTITUTION(S)
AVIATION	☐ PILOT ☐ OTHER (specify)			

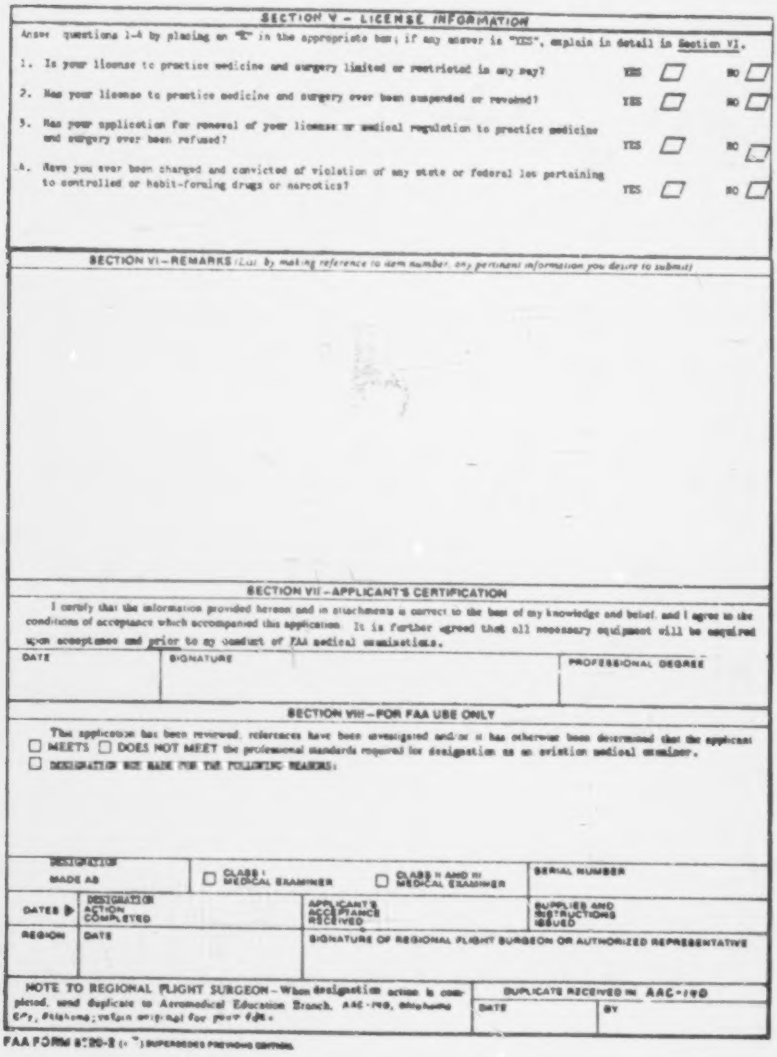
MILITARY	BRANCH OF SERVICE	FLIGHT SURGEON ☐ YES ☐ NO	ARE YOU NOW ON EXTENDED ACTIVE DUTY ? ☐ YES ☐ NO ARE YOU NOW A MEMBER OF ACTIVE RESERVE ? ☐ YES ☐ NO or NATIONAL GUARD ? ☐ YES ☐ NO

SECTION IV - MEDICAL SPECIALTY INFORMATION

DIPLOMATE, AMERICAN BOARD(S) OF (List)	SPECIALTY SOCIETIES (List)	AVIATION MEDICAL SOCIETIES (List)

FAA FORM 8520-2 ( ) SUPERSEDES PREVIOUS EDITION

APPENDIX 1 - SAMPLE APPLICATION FORM CONT'D



SECTION V - LICENSE INFORMATION

Answer questions 1-4 by placing an "X" in the appropriate box; if any answer is "YES", explain in detail in Section VI.

1. Is your license to practice medicine and surgery limited or restricted in any way? YES ☐ NO ☐
2. Has your license to practice medicine and surgery ever been suspended or revoked? YES ☐ NO ☐
3. Has your application for renewal of your license or medical regulation to practice medicine and surgery ever been refused? YES ☐ NO ☐
4. Have you ever been charged and convicted of violation of any state or federal law pertaining to controlled or habit-forming drugs or narcotics? YES ☐ NO ☐

SECTION VI – REMARKS *(List by making reference to item number, any pertinent information you desire to submit)*

SECTION VII – APPLICANT'S CERTIFICATION

I certify that the information provided hereon and in attachments is correct to the best of my knowledge and belief, and I agree to the conditions of acceptance which accompanied this application. It is further agreed that all necessary equipment will be acquired upon acceptance and prior to my conduct of FAA medical examinations.

DATE	SIGNATURE	PROFESSIONAL DEGREE

SECTION VIII – FOR FAA USE ONLY

This application has been reviewed, references have been investigated and/or it has otherwise been determined that the applicant ☐ MEETS ☐ DOES NOT MEET the professional standards required for designation as an aviation medical examiner.

☐ DESIGNATION NOT MADE FOR THE FOLLOWING REASONS:

DESIGNATION MADE AS	☐ CLASS I MEDICAL EXAMINER	☐ CLASS II AND III MEDICAL EXAMINER	SERIAL NUMBER
DATES ▶	DESIGNATION ACTION COMPLETED	APPLICANT'S ACCEPTANCE RECEIVED	SUPPLIES AND INSTRUCTIONS ISSUED
REGION	DATE	SIGNATURE OF REGIONAL FLIGHT SURGEON OR AUTHORIZED REPRESENTATIVE	

NOTE TO REGIONAL FLIGHT SURGEON – When designation action is completed, send duplicate to Aeromedical Education Branch, AAC-140, Oklahoma City, Oklahoma; retain original for your file.	DUPLICATE RECEIVED IN AAC-140	
	DATE	BY

FAA FORM 8520-2 ([illegible]) SUPERSEDES PREVIOUS EDITION

APPENDIX 2 - SAMPLE LETTER #1

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

(Return Address)

This is in reply to your recent inquiry about designation as an Aviation Medical Examiner for the Federal Aviation Administration.

Enclosed is a designation application. We invite your attention to the informational material and requirements for designation contained in the yellow cover sheet.

Complete all forms in their entirety. You must acquire all of the equipment listed on the reverse of the application instruction sheet (or accepted substitutes) before becoming a designated medical examiner for this agency; however, we suggest that you do NOT purchase any of the equipment which you may lack until you have been approved for designation.

The completed application, and statement from your medical society and/or physicians' references should be forwarded to us at the above address.

Sincerely,

Regional Flight Surgeon

Enclosures

SAMPLE

APPENDIX 2 - SAMPLE LETTER #2

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

(Return Address)

You are hereby designated as an Aviation Medical Examiner for the Administrator of the Federal Aviation Administration (FAA). This designation will become effective when you have signed and returned the duplicate copy of this letter, which will indicate possession of all the equipment necessary to perform FAA airman medical examinations and your acceptance of the designation under the conditions outlined in this letter.

This designation:

1. Is valid at the address of designation only, and does not automatically continue with the examiner if change of address or practice occurs. In such an event, reinstatement must be approved by the appropriate Regional Flight Surgeon.

2. Delegates authority to you to perform examinations and to issue or deny issuance of second-and third-class medical certificates and student pilot certificates. It does not include authority to examine and certificate airline transport pilots or other applicants for first-class medical Certificates.

3. May be terminated at the discretion of the Administrator. It will automatically expire at the end of one year, but can be renewed annually subject to a satisfactory performance on the part of the examiner. *(Prior to the expiration date, a Request for Redesignation form will be sent to you. This form must be completed and returned before redesignation can be effected.)

You are required to participate in an FAA sponsored Aviation Medicine Seminar within one year following initial designation and within each five-year interval thereafter.

Your Certificate of Designation, Guide for Aviation Medical Examiners, Part 67 of the Federal Aviation Regulation, FAA Orders and FAA forms and supplies will be sent to you upon receipt of the signed copy of this letter. These materials will be for your exclusive use and are not to distributed to any other individuals.

Sincerely,

Regional Flight Surgeon

SAMPLE

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* If Appropriate

APPENDIX 2 - SAMPLE LETTER #3

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

(Return Address)

This letter is in reference to your designation as an aviation medical examiner for the Federal Aviation Administration.

We have assigned the following serial number for identification purposes and it should appear on all your reports of examinations:

Enclosed is your Certificate of Designation. Also enclosed is your Guide and the other working materials you will need in connection with this designation. These materials are for your exclusive use and are not to be distributed to any other individuals.

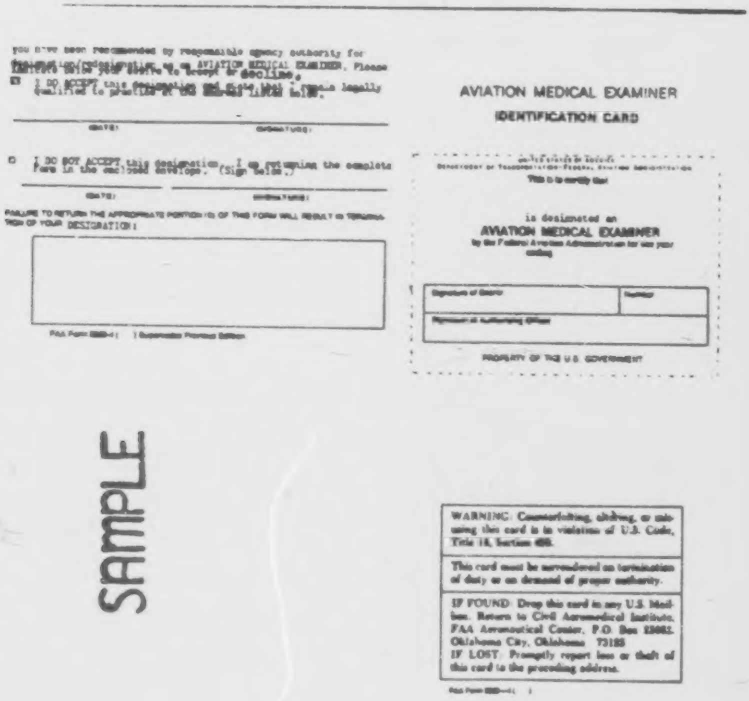
Sincerely,

Regional Flight Surgeon

Enclosures

SAMPLE

APPENDIX 3 - SAMPLE ID CARD



You have been recommended by responsible agency authority for designation/redesignation as an AVIATION MEDICAL EXAMINER. Please indicate below your desire to accept or decline.

☒ I DO ACCEPT this designation and state that I remain legally qualified to practice at the address listed below.

(DATE) (SIGNATURE)

☐ I DO NOT ACCEPT this designation. I am returning the complete form in the enclosed envelope. (Sign below.)

(DATE) (SIGNATURE)

FAILURE TO RETURN THE APPROPRIATE PORTION(S) OF THIS FORM WILL RESULT IN TERMINATION OF YOUR DESIGNATION!

FAA Form [illegible] ( ) Supersedes Previous Edition

AVIATION MEDICAL EXAMINER
IDENTIFICATION CARD

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION–FEDERAL AVIATION ADMINISTRATION
This is to certify that

is designated an
AVIATION MEDICAL EXAMINER
by the Federal Aviation Administration for the year ending

Signature of Doctor	Number
Signature of Authorizing Officer	

PROPERTY OF THE U.S. GOVERNMENT

SAMPLE

WARNING: Counterfeiting, altering, or misusing this card is in violation of U.S. Code, Title 18, Section 499.

This card must be surrendered on termination of duty or on demand of proper authority.

IF FOUND: Drop this card in any U.S. Mailbox. Return to Civil Aeromedical Institute, FAA Aeronautical Center, P.O. Box 25082, Oklahoma City, Oklahoma 73125
IF LOST: Promptly report loss or theft of this card to the preceding address.

FAA Form [illegible] ( )

U.S. GOVERNMENT PRINTING OFFICE: 1978-261-264/205

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
GENERAL AVIATION DISTRICT OFFICES

		Zip Code	Telephone Number
ALABAMA			
Birmingham	6500 43rd Avenue North Municipal Airport FSS/WB Building	35206	(205) 592-6371
ALASKA			
Anchorage	1515 East 13th	99501	(907) 276-3939
Fairbanks	Administration Building 5640 Airport Way International Airport	99701	(907) 452-1276
ARIZONA			
Phoenix	2800 Sky Harbor Blvd., Rm. 112 Sky Harbor Airport	85034	(602) 261-4238
Scottsdale	Scottsdale Municipal Airport	85260	(606) 261-2561
ARKANSAS			
Little Rock	Room 201, FAA Building Adams Field	72202	(501) 372-3437
CALIFORNIA			
Fresno	2401 N. Ashley	93727	(209) 487-5306
Riverside	Riverside Municipal Airport 6961 Flight Road	92504	(714) 787-1245
Sacramento	Executive Airport 6107 Freeport Blvd.	95822	(916) 440-3169
San Diego	3750 John J. Montgomery Drive Montgomery Field Airport	92123	(714) 293-5280
San Jose	1387 Airport Building	95110	(408) 275-7681
Van Nuys	7120 Havenhurst Ave., Suite 316	91406	(213) 997-3191
COLORADO			
Denver	FAA Buidling, Jefferson County Airport Broomfield	80020	(303) 466-7326
Grand Junction	2800 H Road	81501	(303) 243-9518
DISTRICT OF COLUMBIA			
Washington, DC	Washington National Airport West Building, Room 152	20001	(202) 628-1555

FLORIDA

Jacksonville.........Craig Municipal Airport............32211....(904) 641-7311
FAA Building

Opa-Locka (Miami)....Opa-Locka Airport, Bldg. 121.......33054....(305) 681-7431
P. O. Box 365

GEORGIA

Atlanta..............FAA Building, Room 200............30336.....(404) 221-6481
Charlie Brown County Airport

IDAHO

Boise................Boise Airport......................83705....(208) 384-1238
3975 Rickenbacker

ILLINOIS

Springfield..........#3 North Airport Drive............62705.....(217) 492-4238
N. Quadrant, Capital Airport
West Chicago.........P. O. Box H.......................60185.....(312) 584-4490
Dupage County Airport

INDIANA

Indianapolis.........International Airport.............46241.....(317) 247-2491
6801 Pierson Drive
South Bend...........Michiana Regional Airport.........46628.....(219) 236-8480
1843 commerce Drive
Des Moines...........2021 Army Post Road...............50321.....(816) 374-3767

KANSAS

Kansas City..........2nd Floor, Adminsitration Bldg....66115.....(816) 281-3491
Fairfax Airport
Wichita..............Flight Standards Building.........67209.....(316) 943-3244
Mid Continent Airport

KENTUCKY

Louisville...........Bowman Field, FAA Building........40205.....(502) 582-6116

LOUISIANA

Lafayette............Regional Airport..................70508.....(318) 234-2321
Room 101, FAA Building
New Orleans..........FAA Building, Lakefront Airport...70126.....(504) 241-2506
Shreveport...........Room 137, Terminal Building.......71107.....(318) 226-5379
Downtown Airport

MAINE

Portland.............Portland International Jetport....04102.....(207) 774-4484
General Aviation Terminal

MARYLAND

Baltimore............North Administration Building.....21240.....(310) 761-2610
Baltimore-Washington
Int'l Airport, Elm Road

MASSACHUSETTS

Norwood (Boston).....Municipal Airport.................02602.....(617) 762-2436
Westfield............1st Floor, Administration Bldg....01085.....(413) 568-3121
Barnes Municipal Airport
P. O. Box 544

MICHIGAN

Grand Rapids.........Kent County Airport...............49508.....(616) 456-2427
5500 44th Street, SE
Ypsilanti (Detroit)..Willow Run Airport................48197.....(313) 485-2550

MINNESOTA

Minneapolis..........6201 34th Avenue, South...........55450.....(612) 725-3341
Minneapolis-St. Paul Int'l Arpt.

MISSISSIPPI

Jackson..............P. O. Box 5885, Pearl Station.....39208.....(601) 969-4633
Jackson Municiapl Airport

MISSOURI

St. Louis........ ...9275 Genaire Drive, Berkeley......63134.....(314) 731-0930

MONTANA

Billings.............Rm. 216, Administration Buldg.....59101.....(406) 245-6179
Billings-Logan Field
Helena...............FAA Building, Room 3..............59601.....(406) 449-5270
Helena Arpt., P. O. Box 1167

NEBRASKA

Lincoln..............General Aviation Building.........68521.....(402) 471-5485
Lincoln Municipal Airport

NEVADA

Reno.................601 S. Rock Blvd., Suite D-102....89502.....(702) 784-5321

NEW MEXICO

Albuquerque	2402 Kirtland, Drive, SE	87106	(505) 247-0156

NEW YORK

Albany	Albany County Airport CFR & M Building	12211	(518) 869-8482
Farmingdale	Building 53, Republic Airport	11735	(516) 694-5530
Rochester	1295 Scottsville Road Rochester-Monroe County Airport	14624	(716) 263-5880

NORTH CAROLINA

Charlotte	FAA Bulding, Municipal Airport P. O. Box 19005	28219	(704) 392-3214
Raleigh	Raleigh-Durham Airport Mail Route 1, Box 486A Morrisville	27560	(919) 755-4240

NORTH DAKOTA

Fargo	Douglas Municipal Airport FAA Building, Hector Field P. O. Box 5496	58102	(701) 232-8949

OHIO

Cincinnati	Executive Building Ground Floor, 4242 Airport Rd.	45226	(513) 684-2183
Cleveland	Cleveland Hopkins Int'l Arpt	44135	(216) 267-0020
Columbus	Port Columbus Int'l Arpt 4393 E. 17th Avenue, Room 234 Lan Aviation Building	43219	(614) 469-7476

OKLAHOMA

Oklahoma City	FAA Building, Room 202 Wiley Post Arpt., Bethany	73008	(405) 789-5220
Tulsa	General Aviation Terminal Rm. 110, Tulsa Int'l Arpt.	74115	(918) 835-7619

OREGON

Eugene	Mahlon-Svvect Airport 90606 Greenhill Road	97401	(503) 688-9721
Portland	Portland-Hillsboro Airport 3355 NE Cornell Road	97123	(503) 221-2104

PENNSYLVANIA

Allentown	Allentown-Bethlehem-Easton Arpt. RAS Aviation Center Building	18103	(215) 776-4420
Harrisburg	Administration Bldg., Rm. 201 New Cumberland Capital City Arpt.	18103	(717) 782-4528
Philadelphia	North Philadelphia Airport	19114	(215) 776-4420
Pittsburgh	Allegheny County Airport Administration Bldg., Rm. 213 West Mifflin	15122	(412) 461-2726

SOUTH CAROLINA

West Columbia	Columbia Metropolitan Airport	29169	(803) 765-5931

SOUTH DAKOTA

Rapid City	Rapid City Regional Airport RR 2, Box 633B	57701	(605) 343-2403

TEXAS

Dallas	Love Field, 8032 Aviation Place	75232	(214) 357-0142
El Paso	Rm. 202, Federal Aviation Bldg. 6795 Convair Road	79925	(915) 778-6389
Lubbock	International Airport Mail: Rt. 3, Box 51	79417	(806) 762-0335

UTAH

Salt Lake City	116 N. 23rd West, Room 100	84116	(801) 524-4247

VIRGINIA

Richmond	Int'l Arpt., Terminal Bldg 2nd Floor, Sandston	23150	(804) 222-7494

WASHINGTON

Spokane	5629 East Rutter Road Felts Field Airport	99206	(509) 456-4618

WEST VIRGINIA

Charleston	Kanawha County Airport	25311	(304) 343-4689

WYOMING

Casper	1187 Fuller Street Natrona County Int'l Airport	82601	(307) 234-8959

PUERTO RICO

San Juan	RFD #1, Box 29A Loiza St., Santurce Station	00914	(809) 791-0374

APPENDIX 4

DEPARTMENT OF TRANSPORTATION

CERTIFICATE OF TRUE COPY

I HEREBY CERTIFY that the attached {is a true copy / [illegible]} of the original

list [illegible]irline pilots granted an exemption or special issuance medical cert[illegible]te between the dates of January 1, 1982, and July 31, 1985.

on fil[illegible]e Aeromedical Certification Branch; and t[illegible] am the legal custodian thereof.

Signed and dated at Oklahoma City, Oklahoma

this 16th day of August, 19 85

Nova L. Green

NOVA L. GREEN

by Medical Record Technician

~~Supervisor, Records Section~~

Aeromedical Certification Branch

(Title)

Civil Aeromedical Institute

* *

I HEREBY CERTIFY that NOVA L. GREEN

who signed[illegible]going certificate is now, and was, at the time of signing the legal[illegible]ian of the aforesaid records,

and that full[illegible] credit should be given his certificate as such.

IN WITNESS WHEREOF, I have hereunto subscribed my name and caused the seal of the Department of Transportation to be affixed this 16th day of August, 19 85

at Oklahoma City, Oklahoma

Audie W. Davis

AUDIE W. DAVIS, M.D.

(Signature)

Manager, Aeromedical Certification Branch

(Title)

Civil Aeromedical Institute

Department of Transportation

C FAA AC 73-5735

Form DOT F 2100.1 (9-69) [illegible] OP-2

JANUARY 1, 1982, through JULY 31, 1985

Airline Pilots - Exemption and Special Issuance Medical Certifications

Neurological Conditions	18	Coronary Artery Bypass Graft Surgery or Angioplasty	50
Psychiatric Conditions	14		
Miscellaneous Conditions	2	Other Cardiovascular Conditions	17
Myocardial Infarction	20	Alcoholism	293

FOLLOWUP REPORTS REQUIRED: at 6-month or 12-month intervals

MI(myocardial infarction);CAD(coronary artery disease); CABG(coronary artery bypass graft surgery; PTCA(percutaneous transluminal coronary angioplasty)

Reports of cardiovascular examinations by a specialist in cardiology or internal medicine including medical history as to symptoms or treatment referable to the cardiovascular system; general physical examination to include blood pressure, weight, funduscopic, and cardiac examination; report of blood cholesterol and triglycerides; electrocardiograms taken at rest and with a maximal (treadmill or bicycle ergometer) stress test with appropriate blood pressure responses noted. All resting and exercise electrocardiographic tracings must be furnished.

Other tests that may be required: Nuclear cardiology studies including an exercise/rest thallium 201 myocardial perfusion scan and data on left ventricle function (wall motion and ejection fraction by either gated blood pool scanning (stress MUGA) or by first pass technetium); echocardiogram; 24-hour Holter monitor test.

Alcoholism: monitoring reports at monthly, quarterly, 6-month or 12-month intervals

(1) Monthly reports from airman's flight operations supervisor and union representative (ALPA or APA or F.E.I.A.).
(2) Quarterly reports from the aftercare counselor.
(3) 6-month or annual psychiatric reports from a designated psychiatrist.
(4) Blood alcohol and liver function tests as deemed necessary by the monitor.
(5) Annual electrocardiogram tracings required of airmen at age 40.
These reports are collected by a designated physician monitor and presented to the FAA at 6-month intervals. The requirement for followup reports remains in effect for a minimum of 24 months.

Neurological conditions: Neurological evaluation, by a neurologist. Depending upon the airman's history, we may require an electroencephalogram, CAT scan, or Doppler spectral analysis.

Psychiatric conditions: Report of psychiatric interview at 6-month or 12-month intervals. Repeat psychological testing may be required in some circumstances.

Followup reports are determined on an individual basis and depend upon the airman's medical hisotry and present condition.

NEUROLOGICAL CONDITIONS

DATE OF BIRTH	DATE OF ISSUANCE	CLASS	MEDICAL CONDITION	OPR. LIMITS.	DATE TERM.	REASON	AIRLINE
1. 10-9-28	6-10-85	1	R. carotid surgery: vision loss	None			American Airlines
2. 9-8-33	9-12-84	1	Seizure & surg. due to R. lobe arter. malf.	None			American Airlines
3. 10-28-24	2-28-85	2	Carotid art. disease req. endart.	*(1)			American Airlines
4. 10-20-34	1-12-83	1	R. carotid occl.: cerebral bypass	None			Braniff Airlines
5. 7-13-24	6-23-83	2	Brain stem transient ischemic att.	*(1)			Braniff Airlines
6. 5-25-42	12-27-83	1	Cerebral infarction with hemorrhage	None			Continental Airlines
7. 8-1-32	11-2-82	1	Cerebral dysfunction	None			Eastern Airlines
8. 6-19-26	2-13-85	1	Transient global amnesia	None			Eastern Airlines
9. 2-2-44	12-13-84	1	Recurrent syncopal att. req. med.	None			Frontier Airlines
10. 10-10-19	4-8-85	1	L. carotid endarterect.	None			N. W. Airlines
11. 12-25-28	10-14-82	1	Seizure of unknown etiology	None			Pan Am
12. 9-12-38	8-28-84	1	Head injury requiring craniotomy	None			Republic Airlines
13. 12-4-42	7-8-83	2	Hydrocephalus requiring a shunt	*(2)	7-16-84	Upgraded to Class I No opr. limits.	Southwest Airlines
14. 2-13-44	4-4-84	2	Head injury requiring craniotomy	*(2)			Transamerica Airlines
15. 12-28-28	3-7-85	1	Cerebral infarction and hypertension	None			T.W.A.
16. 4-16-29	4-29-85	1	Vascular malformation req. surgery	None			T. W. A.
17. 5-22-34	6-14-85	1	Transient ischemic attack	None			United Airlines
18. 4-16-43	2-19-85	1	Cerebrovas. accident	None			United Airlines

Operational limitions: (1) Valid for Flight Engineer Duties Only.
(2) Not Valid For Pilot-In-Command.

PSYCHIATRIC CONDITIONS

DATE OF BIRTH	DATE OF ISSUANCE	CLASS	MEDICAL CONDITION	OPR. LIMITS.	DATE TERM.	REASON	AIRLINE
1. 4-9-48	9-13-82	2	Drug abuse & trafficing	None	4-19-85	Upgraded to Class I	Americal Airlines
2. 1-31-30	9-9-82	1	Chronic Depression	None			Britt Airways
3. 10-30-31	8-10-82	1	Phobic Condition	None			Delta Airlines
4. 1-23-40	1-9-85	1	Alcohol abuse and situat-ional react.	None			Delta Airlines
5. 12-31-47	5-9-84	1	Reactive Depression	None			Metro Airlines
6. 1-30-49	4-16-85	2	Psychosis & major dep. episodes	None			Metro Airlines
7. 6-11-53	8-16-82	1	Emotional problems	None	12-7-82	Rehospitalization for adverse change in cond.	N. W. Airlines
8. 9-19-35	10-28-82	1	Criminal sexual conduct	None			N. W. Airlines
9. 9-30-31	10-19-83	1	Acute sit-uational reaction	None			Pan Am
10. 2-9-41	6-6-83	1	Personality disorder	None			Republic Airlines
11. 6-18-43	1-25-85	1	Nervous disorder	None			Saudi Airlines
12. 7-20-39	4-12-84	2	Depressive episode	None			T.W.A.
13. 10-23-40	1-6-84	1	Alcohol abuse & situation-al depress.	None			United Airlines
14. 10-2-43	12-9-83	1	Depression	None			Western Airlines

MISCELLANEOUS CONDITIONS

DATE OF BIRTH	DATE OF ISSUANCE	CLASS	MEDICAL CONDITION	OPR. LIMITS.	DATE TERM.	REASON	AIRLINE
1. 8-2-49	3-8-85	2	Pancreatic carcinoma resulting in diabetes/insulin	None			Republic Airlines
2. 2-27-28	6-29-83	2	Carcinoma of prostate req. surgery	None	7-16-83	Adverse change in cond.	T.W.A.

MYOCARDIAL INFARCTION

DATE OF BIRTH	DATE OF ISSUANCE	CLASS	MEDICAL CONDITION	OPR. LIMITS.	DATE TERM.	REASON	AIRLINE
1. 1-8-34	3-14-85	1	MI & CAD	None			American Airlines
2. 6-9-24	5-3-85	2	M.I.	*(1)			American Airlines
3. 11-10-34	11-16-84	1	M.I.	None			Delta Airlines
4. 7-19-33	5-21-85	1	M.I.	None			Eastern Airlines
5. 7-19-34	5-18-84	1	M.I.	None			Eastern Airlines
6. 9-19-33	12-23-82	2	M.I.	*(1)			Pan Am
7. 11-9-37	3-7-85	2	M.I.	None			Pan Am
8. 9-29-14	3-19-84	2	M.I. & apical aneurysm	*(1)			Pan Am
9. 6-6-36	12-22-82	1	M.I. and hypertension	None			N. W. Airlines
10. 2-12-38	6-3-83	2	M.I.	*(2)			N. W. Airlines
11. 2-4-34	4-7-83	1	M.I. & CAD	None			Republic Airlines
12. 11-24-40	3-29-82	2	M.I.	None			Saudi Airlines
13. 11-29-38	9-30-82	2	M.I.	*(1)			T.W.A.
14. 9-16-37	6-25-85	2	M.I.	None			United Airlines
15. 6-21-26	7-17-85	1	M.I.	None			United Airlines
16. 2-19-32	1-10-83	2	M.I.	*(1)	4-2-85	Upgraded to Class I; No opr. limitations	United Airlines
17. 9-4-25	6-25-82	2	M.I.	*(1)			United Airlines
18. 3-10-25	2-27-85	2	M.I.	None			U.S. Air
19. 3-5-36	10-5-83	2	M.I.	None			World Airways

Operational limitations: (1) Valid For Flight Engineer Duties Only.
(2) Not Valid For Pilot-In-Command.

MYOCARDIAL INFARCTION

DATE OF BIRTH	DATE OF ISSUANCE	CLASS	MEDICAL CONDITION	OPR. LIMITS.	DATE TERM.	REASON	AIRLINE
20. 10-12-28	8-2-82	2	M.I.	*(1)			Pan Am

CORONARY ARTERY BYPASS GRAFT SURGERY AND ANGIOPLASTY

DATE OF BIRTH	DATE OF ISSUANCE	CLASS	MEDICAL CONDITION	OPR. LIMITS.	DATE TERM.	REASON	AIRLINE
1. 5-30-34	12-28-84	1	CAD & PTCA	None			Alaskan Airlines
2. 10-2-38	11-9-82	2	CAD & CABG	None			Alaskan Airlines
3. 7-24-40	7-10-85	1	CAD & CABG	None			American Airlines
4. 7-30-35	6-21-85	1	CAD & PTCA	None			American Airlines
5. 1-27-33	3-8-85	1	CAD & PTCA	None			American Airlines
6. 6-7-29	3-15-85	1	M.I. & CABG	None			American Airlines
7. 5-15-23	6-22-82	2	CAD & CABG	None			American Airlines
8. 6-1-30	12-22-82	1	CAD & CABG	None			Delta Airlines
9. 10-31-37	1-9-85	1	CAD & CABG	None			Delta Airlines
10. 10-15-40	2-27-85	1	M.I. & CABG	None			Delta Airlines
11. 2-12-30	11-1-82	1	CAD & CABG	None			Delta Airlines
12. 5-7-34	9-28-82	1	CAD & CABG	None			Delta Airlines
13. 4-11-35	8-20-82	2	CAD & CABG	None			Delta Airlines
14. 11-27-31	7-25-84	2	CAD & CABG	*(1)			Evergreen Int'l. Airline
15. 5-23-41	8-30-82	1	CAD & CABG	None			Flying Tiger Airlines
16. 12-7-28	11-23-82	1	CAD & CABG	None			Frontier Airlines
17. 8-16-26	2-16-84	2	CAD & CABG	*(3)			Great Northern Airline
18. 11-3-42	12-13-83	1	M.I. & PTCA	None			N.W. Airlines
19. 12-1-28	6-26-84	1	CAD & CABG	None			Pan Am

CORONARY ARTERY BYPASS GRAFT SURGERY AND ANGIOPLASTY

	DATE OF BIRTH	DATE OF ISSUANCE	CLASS	MEDICAL CONDITION	OPR. LIMITS.	DATE TERM.	REASON	AIRLINE
20.	6-7-31	4-25-83	2	CAD & CABG	*(1)	1-4-85	Upgraded to Class I; No opr. limitations	Pan Am
21.	9-1-39	12-27-82	2	CAD & CABG	*(2)	5-6-85	Upgraded to Class I; No opr. limitations	Pan Am
22.	9-18-39	8-20-82	1	CAD & CABG	None			Pan Am
23.	3-6-33	1-3-85	2	CAD & CABG	*(1)			Pan Am
24.	11-6-25	2-10-82	2	CAD & CABG	*(1)			Pan Am
25.	8-19-31	2-4-85	2	CAD & CABG	*(1)	3-15-85	Angina symptoms	Pan Am
26.	5-9-41	7-26-85	1	M.I. & CABG	None			Piedmont Airlines
27.	4-26-28	3-22-85	1	M.I. & CABG	None			Piedmont Airlines
28.	2-25-33	5-29-85	1	M.I. & CABG	None			Republic Airlines
29.	10-19-29	3-19-82	1	CAD & CABG	None			Republic Airlines
30.	2-20-28	11-15-83	2	M.I. & CABG	*(2)			Republic Airlines
31.	6-10-46	1-15-85	1	CAD & CABG	None			Southwest Airlines
32.	1-4-26	6-11-85	1	CAD & PTCA	None			T.W.A.
33.	2-12-21	6-11-85	2	CAD & PTCA	*(1)			T.W.A.
34.	2-20-42	6-4-85	1	CAD & PTCA	None			T.W.A.
35.	1-10-24	6-4-85	1	CAD & CABG	None			T.W.A.
36.	12-3-34	2-22-82	1	CAD & CABG	None			T.W.A.
37.	3-24-39	12-23-83	2	CAD & CABG	*(2)			T.W.A.
38.	8-26-37	6-28-84	2	CAD & PTCA	None	7-11-85	Issued Cl. I	T.W.A.

CORONARY ARTERY BYPASS GRAF SURGERY AND ANGIOPLASTY

DATE OF BIRTH	DATE OF ISSUANCE	CLASS	MEDICAL CONDITION	OPR. LIMITS.	DATE TERM.	REASON	AIRLINE
39. 2-1-34	5-19-83	2	M.I. & PTCA	*(2)	12-28-84	Upgraded to Class 1; No opr. limitations	United Airlines
40. 6-21-32	7-24-78	2	CAD & CABG	*(2)	4-29-85	Upgraded to Class 1; No opr. limitations	United Airlines
41. 6-19-36	2-7-85	1	CAD & PTCA	None			United Airlines
42. 10-5-38	2-5-85	1	CAD & CABG	None			United Airlines
43. 4-15-29	12-27-83	2	CAD & CABG	*(1)	6-24-85	Issued unlimited second-class	United Airlines
44. 4-20-36	8-19-83	2	CAD, CABG & Hypertension	*(2)			United Airlines
45. 3-21-32	7-21-83	2	CAD & CABG	*(1)			United Airlines
46. 4-16-32	2-12-85	1	CAD & CABG	None			U.S. Air
47. 2-6-41	6-4-85	1	CAD & CABG	None			U.S. Air
48. 9-17-31	5-7-85	2	M.I. & PTCA	*(1)			World Airways
49. 5-19-22	6-21-83	2	CAD & CABG	*(1)	4-8-85	Upgraded to Class 1; No opr. limitations	World Airways
50. 9-4-25	5-15-85	2	CAD & CABG	None			World Airways

Operational limitations:
(1) Valid For Flight Engineer Duties Only.
(2) Not Valid For Pilot-In-Command.
(3) Must Be Accompanied by a Qualified Pilot when Carrying Passengers, except for private pilot privileges.

OTHER CARDIOVASCULAR CONDITIONS

DATE OF BIRTH	DATE OF ISSUANCE	CLASS	MEDICAL CONDITION	OPR. LIMITS.	DATE TERM.	REASON	AIRLINE
1. 9-18-21	1-12-83	2	CAD and angina	None			American Airlines
2. 6-20-22	1-24-85	2	Arrhythmia & abn. EKGs	None			American Airlines
3. 3-1-34	6-19-84	2	Abnormal EKG & vent. ect.	*(2)			Air B.V.I. (British Virgin Islands)
4. 11-14-39	7-20-83	1	Abnormal EKG and CAD	None			Britt Airlines
5. 6-21-26	3-22-85	1	Ventricular arrhythmia	None			Delta Airlines
6. 12-30-31	6-25-85	1	Angina & CAD	None			Delta Airlines
7. 7-5-35	1-6-84	1	Atrial fibrillation	None			Eastern Airlines
8. 4-17-43	1-14-85	1	Aortic valve replacement	None			Horizon Airlines
9. 9-2-33	3-30-84	1	Mitral valve prolapse	None			N.W. Airlines
10. 10-21-29	12-26-84	2	Coronary artery disease	*(2)			Scenic Airlines
11. 3-28-32	1-24-85	2	CAD and hypertension	*(1)	7-17-85	Issued unlimited second-class	T.W.A.
12. 8-22-22	5-6-85	2	Coronary art. dis. & angina	None			United Airlines
13. 3-12-24	10-27-83	1	Atrial fibrillation	None			United Airlines
14. 11-20-29	10-24-84	1	Mitral valve pro., LBBB	None			United Airlines
15. 3-14-28	1-22-82	1	Aortic valve replacement	None			United Airlines
16. 7-12-30	5-29-85	1	Angina and CAD	None			U.S. Air
17. 3-16-36	6-29-83	2	CAD & LBBB	None	8-16-84	Angina symptoms	Western Airlines

Operational limitations: (1) Valid for Flight Engineer Duties Only.
(2) Not Valid for Pilot-In-Command.

ALCOHOLISM

DATE OF BIRTH	DATE OF ISSUANCE	CLASS	MEDICAL CONDITION	OPR. LIMITS.	DATE TERM.	REASON	AIRLINE
1. 5-20-51	10-15-82	1	Alcoholism	None			Air Florida
2. 10-29-39	2-11-85	1	"	"			Air Georgia
3. 1-21-47	12-22-82	1	"	"			Air Wisconsin
4. 10-12-42	8-6-84	1	"	"			Air Wisconsin
5. 9-9-44	11-4-82	1	"	"			American Airlines
6. 11-29-34	5-28-85	1	"	"			"
7. 12-8-38	7-2-85	1	"	"			"
8. 3-8-30	3-16-84	1	"	"			"
9. 1-5-26	5-25-84	1	"	"			"
10. 8-18-30	7-19-82	2	"		10-7-83	M.I.	"
11. 9-10-35	5-29-85	1	"	"			"
12. 4-14-33	2-2-83	1	"	"			"
13. 11-1-28	2-27-84	1	"	"			"
14. 9-25-28	11-28-84	1	"	"			"
15. 5-7-36	3-5-82	1	"	"			"
16. 2-18-32	2-20-85	1	"	"			"
17. 12-19-37	7-27-82	1	"	"			"
18. 4-14-30	3-22-85	1	"	"			"
19. 11-29-36	7-27-82	1	"	"			"

ALCOHOLISM

DATE OF BIRTH	DATE OF ISSUANCE	CLASS	MEDICAL CONDITION	OPR. LIMITS.	DATE TERM.	REASON	AIRLINE
20. 7-23-27	2-27-85	1	Alcoholism	None			American Airlines
21. 3-17-33	7-28-82	1	"	"			"
22. 2-16-34	12-1-83	1	Alcoholism & toxic psych.	"			"
23. 11-11-26	11-15-83	1	Alcoholism	"			"
24. 5-20-40	9-18-84	1	"	"			"
25. 4-4-37	6-20-84	1	"	"			"
26. 6-8-41	9-8-83	1	"	"	4-16-84	Resumed drinking	"
27. 9-11-24	10-26-83	1	"	"			"
28. 11-30-36	9-18-84	1	"	"			"
29. 2-21-33	10-15-82	1	"	"			"
30. 4-12-39	1-31-85	1	"	"			"
31. 4-22-32	5-17-84	1	"	"			"
32. 6-9-29	4-5-82	1	"	"			"
33. 7-8-24	2-17-84	1	"	"			"
34. 9-6-45	10-15-82	1	"	"			Astro-Wing Airlines
35. 6-16-53	2-8-85	1	"	"			Atlantic S.E. Airlines
36. 12-9-23	2-26-82	1	"	"			Braniff Airlines
37. 10-2-36	5-28-85	1	"	"			"
38. 11-1-39	1-8-85	1	"	"			"

ALCOHOLISM

DATE OF BIRTH	DATE OF ISSUANCE	CLASS	MEDICAL CONDITION	OPR. LIMITS.	DATE TERM.	REASON	AIRLINE
39. 9-1-43	7-25-83	1	Alcoholism	None			Cascade Airways
40. 6-27-48	9-23-83	1	"	"			"
41. 1-31-37	3-23-83	1	"	"			Continental Airlines
42. 2-22-40	7-6-83	1	"	"			"
43. 6-4-43	6-30-83	1	"	"			"
44. 4-14-39	7-1-83	1	"	"			"
45. 5-12-39	7-14-82	1	"	"			"
46. 10-19-39	3-2-83	1	"	"			"
47. 9-11-41	3-29-82	1	"	"			"
48. 9-3-42	3-25-83	1	"	"			"
49. 5-28-40	8-13-82	1	"	"			"
50. 5-18-40	10-22-84	1	"	"			"
51. 11-18-41	5-18-83	1	"	"			"
52. 12-23-26	8-24-83	1	"	"			"
53. 7-26-36	7-2-85	1	"	"			Delta Airlines
54. 5-31-32	3-21-85	1	"	"			"
55. 6-19-34	4-23-85	1	"	"			"
56. 3-10-36	4-11-85	1	"	"			"
57. 8-29-38	1-24-85	1	"	"			"

ALCOHOLISM

DATE OF BIRTH	DATE OF ISSUANCE	CLASS	MEDICAL CONDITION	OPR. LIMITS.	DATE TERM.	REASON	AIRLINE
58. 12-21-37	4-26-85	1	Alcoholism	None			Delta Airlines
59. 11-12-38	4-11-85	1	"	"			"
60. 3-13-39	5-25-84	1	"	"			"
61. 3-3-41	5-11-84	1	"	"			"
62. 4-27-39	12-21-83	1	"	"			"
63. 12-12-37	7-25-83	1	"	"			"
64. 4-13-39	2-9-84	1	"	"			"
65. 10-2-36	7-20-84	1	"	"			"
66. 5-22-39	6-26-81	1	"	"	8-4-83	Denied due to CAD & PTCA Issued Cl. 1, 4-8-85	"
67. 1-22-36	6-21-83	1	"	"			"
68. 3-14-26	3-4-83	1	Alcoholism & cancer of larynx.	"			"
69. 9-21-24	9-1-83	1	Alcoholism	"			"
70. 10-20-39	9-2-83	1	"	"			"
71. 8-1-41	3-9-84	1	"	"			"
72. 5-25-39	11-3-83	1	"	"			"
73. 3-30-37	3-2-84	1	"	"			"
74. 7-14-40	4-15-84	1	"	"			"
75. 3-23-38	3-9-84	1	"	"			"
76. 12-21-31	3-25-83	1	"	"			"

ALCOHOLISM

DATE OF BIRTH	DATE OF ISSUANCE	CLASS	MEDICAL CONDITION	OPR. LIMITS.	DATE TERM.	REASON	AIRLINE
77. 1-9-35	7-25-84	1	Alcoholism	None			Delta Airlines
78. 4-6-43	4-15-84	1	"	"			"
79. 6-18-40	10-28-83	1	"	"			"
80. 2-27-38	3-1-83	1	Alcoholism & seizures	"			"
81. 3-2-37	8-18-83	1	Alcoholism	"			"
82. 3-23-36	8-24-83	1	"	"			"
83. 3-21-36	11-4-82	1	"	"			"
84. 6-5-26	2-16-84	1	"	"			"
85. 2-15-36	2-16-84	1	"	"			"
86. 8-20-42	8-29-84	1	"	"			"
87. 11-10-42	5-13-83	1	"	"			"
88. 10-27-47	2-24-84	1	"	"			"
89. 11-26-44	9-18-84	1	"	"			"
90. 11-15-32	9-16-83	1	"	"			"
91. 5-6-40	3-15-85	1	"	"			Eastern Airlines
92. 1-3-31	4-26-85	1	"	"			"
93. 12-29-33	4-29-85	1	"	"			"
94. 8-10-37	4-26-85	1	"	"			"
95. 6-23-35	7-1-85	1	Alcoholism depression	"			"

ALCOHOLISM

DATE OF BIRTH	DATE OF ISSUANCE	CLASS	MEDICAL CONDITION	OPR. LIMITS.	DATE TERM.	REASON	AIRLINE
96. 4-9-44	4-8-85	1	Alcoholism	None			Eastern Airlines
97. 8-1-37	4-11-85	1	"	"			"
98. 4-2-39	4-15-84	1	"	"			"
99. 5-31-33	12-21-83	1	Alcoholism depression	"			"
100. 1-8-30	3-23-83	1	Alcoholism	"	12-7-84	Resumed drinking	"
101. 6-6-33	8-23-84	1	"	"			"
102. 6-25-37	8-24-84	1	"	"			"
103. 9-12-35	10-21-84	1	"	"			"
104. 5-23-44	1-9-85	1	Alcoholism & drug abuse	"			"
105. 12-14-49	1-23-85	1	Alcoholism	"	5-31-85	Resumed drinking	"
106. 4-2-43	4-11-85	1	"	"			"
107. 10-25-44	4-1-85	1	"	"			"
108. 8-17-32	9-19-84	1	"	"	1-1-85	Deceased, air crash	"
109. 7-24-32	3-5-82	1	"	"	4-15-82	Resumed drinking: issued 12-8-82; term. 7-25-83, non-comply. issued 2-27-85	"
110. 6-10-42	4-9-84	1	"	"			"
111. 6-27-35	2-16-84	1	"	"			"
112. 8-28-46	7-17-84	1	"	"			"
113. 9-28-43	2-28-85	1	"	"			"
114. 10-20-34	5-19-83	1	"	"			"

ALCOHOLISM

DATE OF BIRTH	DATE OF ISSUANCE	CLASS	MEDICAL CONDITION	OPR. LIMITS.	DATE TERM.	REASON	AIRLINE
115. 10-23-43	3-20-84	1	Alcoholism	None			Eastern Airlines
116. 4-17-42	2-8-84	1	"	"			"
117. 4-29-34	2-16-83	1	Alcoholism & cocaine	"			"
118. 7-1-38	5-17-83	1	Alcoholism	"			"
119. 5-31-32	4-23-84	1	"	"			"
120. 3-28-30	7-27-82	1	"	"			"
121. 7-10-45	7-2-85	1	"	"			Flying Tiger Airlines
122. 4-3-37	6-29-84	1	"	"			"
123. 5-8-35	7-8-83	1	"	"			"
124. 9-7-41	9-26-83	1	"	"			"
125. 5-23-36	3-10-83	1	"	"			"
126. 10-1-41	10-19-83	1	"	"			"
127. 11-5-44	1-22-82	1	"	"	12-28-82	Emotional problems	"
128. 6-9-36	2-5-85	1	"	"	3-28-85	Resumed drinking	"
129. 5-4-36	1-8-85	1	"	"			"
130. 7-19-30	4-5-83	1	"	"			"
131. 9-15-27	4-19-83	1	"	"	11-14-83	Cardiac condition	Hawaiian Airlines
132. 2-5-46	5-5-83	1	"	"			Metro Airlines
133. 10-13-47	1-2-85	1	"	"			Midway Airlines

ALCOHOLISM

DATE OF BIRTH	DATE OF ISSUANCE	CLASS	MEDICAL CONDITION	OPR. LIMITS.	DATE TERM.	REASON	AIRLINE
134. 11-20-43	8-17-83	1	Alcoholism	None			N.W. Airlines
135. 8-1-42	1-10-84	1	"	"			"
136. 4-7-37	1-28-83	1	"	"			"
137. 2-20-24	3-25-83	1	"	"			Ozark Airlines
138. 8-31-40	1-19-84	1	"	"			"
139. 9-17-22	3-29-82	1	"	"			Ozark Airlines
140. 11-4-38	8-1-83	1	"	"			Pacific S.W. Airlines
141. 9-12-44	7-26-84	1	"	"			"
142. 9-4-37	12-19-83	1	Alcoholism, Intercranial hemorrhage	"			"
143. 6-19-40	4-11-85	1	Alcoholism	"			Pan American
144. 4-8-32	6-28-85	2	"	"			"
145. 6-9-35	4-29-85	1	"	"			"
146. 9-9-29	6-17-82	2	"	"			"
147. 10-22-25	7-11-84	2	"	"			"
148. 3-21-38	7-6-83	1	"	"			"
149. 8-8-41	7-14-82	1	"	"			"
150. 3-16-36	1-25-84	1	"	"			"
151. 10-11-36	1-12-83	1	"	"			"
152. 9-4-27	10-15-82	1	"	"			"

ALCOHOLISM

DATE OF BIRTH	DATE OF ISSUANCE	CLASS	MEDICAL CONDITION	OPR. LIMITS.	DATE TERM.	REASON	AIRLINE
153. 10-12-32	1-16-84	1	Alcoholism	None			Pan American
154. 1-22-44	7-2-84	1	"	"			"
155. 12-11-37	7-19-84	1	"	"			"
156. 10-27-43	3-11-83	1	"	"			"
157. 10-9-36	7-20-84	1	"	"			"
158. 12-23-35	6-30-83	1	"	"			"
159. 12-18-37	3-5-82	1	"	"			"
160. 10-30-38	7-27-82	1	"	"			"
161. 11-23-37	8-6-82	1	"	"			"
162. 4-29-35	11-7-84	1	"	"			"
163. 3-10-38	11-15-84	1	"	"			"
164. 2-28-39	1-24-83	1	"	"		Suicide 11-83	"
165. 10-30-38	8-16-82	1	"	"			"
166. 1-12-32	3-9-83	1	"	"			"
167. 8-8-37	3-25-83	1	"	"			"
168. 9-27-31	1-12-83	1	"	"			"
169. 10-3-41	12-12-84	1	"	"			Piedmont Airlines
170. 2-4-39	9-9-83	1	"	"			"
171. 8-10-42	8-1-84	1	"	"			"

ALCOHOLISM

DATE OF BIRTH	DATE OF ISSUANCE	CLASS	MEDICAL CONDITION	OPR. LIMITS.	DATE TERM.	REASON	AIRLINE
172. 2-5-35	2-7-85	1	Personality disorder & alcoholism	None			Piedmont Airlines
173. 4-22-40	1-31-85	1	Hypertension diabetes & alcoholism	"			"
174. 2-19-49	4-12-84	1	Alcoholism	"			Republic Airlines
175. 11-23-41	5-2-83	1	"	"			"
176. 2-8-24	3-17-82	1	"	"			"
177. 3-12-31	4-6-83	1	"	"			"
178. 7-9-48	3-29-82	1	"	"			"
179. 2-15-44	12-29-82	1	"	"			"
180. 7-23-47	3-17-83	1	"	"			"
181. 6-20-43	8-1-84	1	"	"			"
182. 12-13-41	7-16-84	1	"	"			"
183. 8-8-41	5-10-84	1	"	"			"
184. 6-27-47	7-12-85	1	"	"			Southwest Airlines
185. 9-16-44	7-2-85	1	"	"			Transamerica Airlines
186. 6-2-26	5-12-83	2	"	"			"
187. 4-21-35	8-16-84	1	"	"			"
188. 4-28-28	3-12-82	1	"	"	3-29-85	Resumed drinking	"
189. 10-31-40	7-2-85	1	"	"			T.W.A.
190. 10-28-50	4-2-85	1	"	"			"

ALCOHOLISM

DATE OF BIRTH	DATE OF ISSUANCE	CLASS	MEDICAL CONDITION	OPR. LIMITS.	DATE TERM.	REASON	AIRLINE
191. 3-29-41	7-5-85	1	Alcoholism	None			T.W.A.
192. 5-26-39	3-25-85	1	"	"			"
193. 7-17-39	4-4-85	1	"	"			"
194. 9-20-38	3-15-85	1	"	"			"
195. 2-12-25	6-13-84	2	Psychiatric problems & alcoholism	*(2)			"
196. 11-30-43	6-20-84	1	Alcoholism	None			"
197. 11-1-23	8-18-81	2	"	"			"
198. 7-7-34	7-30-82	1	"	"			"
199. 8-4-39	5-25-83	1	"	"			"
200. 9-23-27	7-19-84	1	"	"			"
201. 5-9-40	8-8-83	1	"	"			"
202. 9-24-35	1-8-85	1	"	"			"
203. 9-22-39	4-7-82	1	"	"			"
204. 12-25-35	11-2-82	1	"	"			"
205. 3-23-37	5-7-85	1	"	"			"
206. 8-21-33	7-7-83	1	"	"			"
207. 4-12-29	5-13-83	1	"	"			"
208. 2-11-35	5-4-84	1	"	"			"
209. 4-21-28	8-17-83	1	"	"			"

ALCOHOLISM

DATE OF BIRTH	DATE OF ISSUANCE	CLASS	MEDICAL CONDITION	OPR. LIMITS.	DATE TERM.	REASON	AIRLINE
210. 11-21-41	2-17-83	1	Alcoholism	None			T.W.A.
211. 5-11-39	4-19-85	1	"	"			"
212. 12-12-41	7-1-83	1	"	"			"
213. 7-31-33	3-26-85	1	"	"			United Airlines
214. 1-28-33	4-1-85	1	"	"			"
215. 1-6-39	4-1-85	1	"	"			"
216. 4-12-40	5-29-85	1	"	"			"
217. 11-16-30	6-4-85	1	"	"			"
218. 12-25-22	10-24-84	2	"	"			"
219. 5-2-32	3-15-83	1	"	"			"
220. 10-6-47	9-14-83	1	"	"			"
221. 6-29-34	7-5-84	1	"	"			"
222. 8-6-35	3-3-83	1	"	"			"
223. 8-31-41	4-7-83	1	"	"			"
224. 3-14-35	1-23-84	1	"	"			"
225. 8-16-26	8-29-84	1	"	"			"
226. 2-6-41	10-15-82	1	"	"			"
227. 6-25-23	8-17-83	1	"	"			"
228. 8-22-27	7-13-83	1	"	"			"

ALCOHOLISM

DATE OF BIRTH	DATE OF ISSUANCE	CLASS	MEDICAL CONDITION	OPR. LIMITS.	DATE TERM.	REASON	AIRLINE
229. 11-1-38	6-20-84	1	Alcoholism	None			United Airlines
230. 3-31-42	3-1-83	1	"	"			"
231. 11-22-37	3-25-83	1	"	"			"
232. 5-8-24	1-25-83	1	"	"			"
233. 4-11-28	2-17-83	1	"	"			"
234. 9-27-30	1-27-83	1	Depression & alcoholism	"			"
235. 4-29-36	3-29-83	1	Alcoholism	"			"
236. 12-3-29	5-24-83	1	"	"			"
237. 8-9-29	3-2-84	1	"	"			"
238. 9-19-40	3-1-83	1	"	"			"
239. 12-16-29	6-20-84	1	"	"			"
240. 2-20-34	12-13-84	1	"	"			"
241. 12-26-38	12-17-84	1	"	"			"
242. 10-27-41	10-22-84	1	"	"			"
243. 12-27-31	4-12-84	1	:	:			"
244. 7-11-29	5-25-84	1	"	"	5-14-85	Cervical degenerative arthritis	"
245. 3-18-37	7-14-82	1	"	"		Deceased 12-21-84	"
246. 3-17-40	1-29-85	1	"	"			"
247. 9-19-38	2-12-85	1	"	"			"

ALCOHOLISM

DATE OF BIRTH	DATE OF ISSUANCE	CLASS	MEDICAL CONDITION	OPR. LIMITS.	DATE TERM.	REASON	AIRLINE
248. 6-30-44	2-7-85	1	Alcoholism	None			United Airlines
249. 7-12-42	8-16-82	1	"	"			"
250. 7-16-32	3-1-83	1	"	"			"
251. 9-22-25	4-12-82	1	Alcoholism, recurrent TIA carotid end.	"	1-13-83	Medical condition; Adverse change	"
252. 3-25-43	1-6-84	1	Alcoholism	"			"
253. 11-27-42	7-15-82	1	"	"			"
254. 6-9-33	5-24-82	1	"	"			"
255. 2-2-32	3-29-82	1	"	"			"
256. 4-15-39	3-10-82	1	"	"			"
257. 10-27-24	8-16-82	1	"	"			"
258. 5-12-35	4-20-83	1	"	"			"
259. 11-18-33	6-22-82	1	"	"			"
260. 11-4-28	5-15-84	1	"	"			"
261. 4-21-26	6-15-84	1	"	"			"
262. 3-24-37	10-26-83	1	"	"			"
263. 1-21-24	2-23-83	1	"	"			"
264. 11-18-28	2-22-83	1	"	"			"
265. 11-27-27	10-26-83	1	"	"	5-30-84	Resumed drinking	"
266. 4-22-37	9-18-84	1	"	"			"

ALCOHOLISM

DATE OF BIRTH	DATE OF ISSUANCE	CLASS	MEDICAL CONDITION	OPR. LIMITS.	DATE TERM.	REASON	AIRLINE
267. 6-25-38	10-11-83	1	Alcoholism	None	4-26-84	Resumed drinking	United Airlines
268. 2-24-30	2-12-82	1	"	"			"
269. 4-19-41	5-20-83	1	"	"			"
270. 3-8-40	5-23-85	1	"	"			U.S. Air
271. 3-19-32	1-22-82	1	"	"			"
272. 2-13-30	3-9-83	1	"	"			"
273. 3-9-45	4-1-82	1	"	"			"
274. 1-17-38	6-20-84	1	"	"			"
275. 2-9-44	4-6-84	1	"	"			"
276. 7-11-40	10-15-82	1	"	"			"
277. 7-31-43	9-2-83	1	"	"			"
278. 12-10-43	5-11-83	1	"	"			"
279. 6-8-36	4-25-83	1	"	"			"
280. 11-25-50	5-4-84	1	"	"			"
281. 12-17-44	5-11-83	1	"	"			"
282. 8-29-25	8-26-83	1	"	"			"
283. 12-14-29	11-22-83	1	"	"			"
284. 8-5-42	10-15-82	1	"	"			Western Airlines
285. 7-24-42	7-28-83	1	"	"			"

ALCOHOLISM

DATE OF BIRTH	DATE OF ISSUANCE	CLASS	MEDICAL CONDITION	OPR. LIMITS.	DATE TERM.	REASON	AIRLINE
286. 5-21-40	4-9-84	1	Alcoholism	None			Western Airlines
287. 7-29-36	3-5-84	1	"	"			"
288. 8-12-39	3-13-85	1	"	"			"
289. 9-23-39	7-26-82	1	"	"			"
290. 9-10-35	2-8-83	1	"	"	9-30-83	Resumed drinking Deceased 12-84	"
291. 8-4-36	9-14-83	1	"	"			"
293. 2-26-42	3-20-84	1	"	"			"

EXEMPTIONS GRANTED TO AIRLINE PILOTS BY THE FAA

FOR MEDICAL REASONS 1961 - 1981

SOURCE:

AEROSPACE MEDICAL CENTER, OKLAHOMA CITY

MARCH 10, 1981

GRANTS OF EXEMPTION FROM THE FAA REGULATIONS

AIRLINE PILOTS

Myocardial infarction:		74
Class I:	25	
Class II:	49	
Coronary artery bypass graft surgery:		12
Class I:	6	
Class II:	6	
Miscellaneous medical conditions:		41
Alcoholism:		335
Class I:	317	
Class II:	18	
TOTAL:		462

	Name	PI#	Class	Defect	Date of Exemption	Date Term.	Airline	Date of Birth	
1.			1	Myocardial Infarction	3-10-70		Braniff Int'l.	9-12-18	52
2.			"	"	5-14-68		American Airlines	8-25-12	56
3.			"	"	2-7-73		Saudi Arabian Airlines	3-15-37	36
4.			"	"	8-9-77		Western Airlines	1-27-36	41
5.			"	"	4-24-75		United Airlines	8-22-18	57
6.			"	"	5-22-72 1-30-74		Western Airlines	12-3-38	34
7.			"	"	10-18-74		Hawaiian Airlines	3-29-22	52
8.			"	"	9-13-76 8-25-77	2-19-81	Texas Int'l. Airlines	4-25-28	48
9.			"	"	7-31-72 6-5-74		Eastern Airlines	1-19-23	49
10			"	"	11-30-77		United Airlines	11-2-30	47
11			"	"	3-8-76 12-8-76		United Airlines	2-13-30	46
12			"	"	2-5-75		United Airlines	3-22-28	47
✓ 13			"	"	4-28-78		Eastern Airlines	7-19-34	44
✓ 14			"	"	9-24-71 4-10-75		Eastern Airlines	10-4-16	55
15			"	"	7-26-61	5-9-73	National Airlines	8-20-14	47
16			"	"	3-7-68	4-22-74	Pan American Airlines	5-11-18	50
17			"	"	5-9-75 10-21-75	6-18-76	American Airlines	10-13-29	46
18			"	"	1-16-70		American Airlines	10-17-14	56
19			"	"	3-27-69 11-13-73	5-15-75	T.W.A.	4-12-25	44

	Name	PI#	Class	Defect	Date of Exemption	Date Term.	Airline	Date of Birth	
20.			1	Myocardial Infarction	3-2-73		United Airlines	6-13-29	44 Deceased
21.			"	"	3-6-63		Pan American Airlines	7-31-10	53 Deceased
22.			"	"	3-23-79		United Airlines	3-8-33	46
23.			"	M.I. and melanoma	2-15-79		T.W.A.	11-2-34	45
24.			"	Myocardial Infarction	10-4-79		American Airlines	4-2-33	46
25.			"	"	3-7-77 3-3-80		Delta Airlines	11-15-37	40
								AVERAGE AGE 47.24	

	PI#	Class	Defect	Date of Exemption	Date Term.	Airline	Date of Birth	
1.		2	Myocardial Infarction	6-28-65 9-7-66		United Airlines	10-28-15	50
2.		"	"	7-26-72		American Airlines	1-2-22	50
3.		"	"	11-19-65		Pan American Airlines	8-28-20	45
4.		"	"	5-14-68		American Airlines	11-9-19	49
5.		"	"	12-7-71		T.W.A.	5-3-20	51
6.		"	"	8-28-68		Seaboard World	5-24-15	53
7.		"	"	8-11-71		World Airways	1-5-33	38
8.		"	"	9-17-71		Allegheny Airlines	3-3-31	40
9.		"	"	9-13-67		American Flyers, Inc.	9-23-20	47
10.		"	"	3-26-70		T.W.A.	8-1-21	49
11.		"	"	3-13-70		United Airlines	11-30-12	58
12.		"	"	4-9-73		United Airlines	5-20-18	55
13.		"	"	7-30-73		Braniff Int'l.	4-6-18	55
14.		"	"	10-3-73		American Airlines	6-22-24	49
15.		"	"	1-13-69		Flying Tiger Airlines	1-21-21	48
16		"	"	2-11-74		Braniff Int'l.	4-29-22	52
17		"	"	2-5-75		Capital Airways	8-9-22	53
18		"	"	12-11-73		Eastern Airlines	4-27-30	43
19		"	"	5-1-75 11-16-76	10-1-79	Western Airlines	4-8-21	54

	Name	PI#	Class	Defect	Date of Exemption	Date Term.	Airline	Date of Birth	
20.			2	Myocardial Infarction	6-7-73 12-19-75		Capital Airways	2-3-29	44
21.			"	"	4-10-72		United Airlines	7-31-21	51
22.			"	"	6-2-78		T.W.A.	8-4-22	56
23.			"	"	8-4-71 5-20-76	6-19-79	American Airlines	8-22-20	51
24.			"	"	10-17-74		Pan American	2-6-27	47
25.			"	"	3-20-62	5-5-76	Airlift Int'l.	7-16-28	34
26.			"	"	5-3-68	4-21-75	Pan American	10-5-24	44
27.			"	"	7-13-70 12-22-71	10-6-77	United Airlines	2-18-28	42
28.			"	"	12-2-71	2-12-75	Trans. Int'l. Airlines	7-15-18	53
29.			"	"	8-31-66	12-31-68	United Airlines	1-15-15	51
30.			"	"	11-14-65	9-22-69	United Airlines	10-2-16	50
31.			"	"	8-26-66	3-5-70	Airlift Int'l.	10-3-15	51
32.			"	"	11-16-67	8-6-70	Northwest Airlines	11-1-15	52
33.			"	"	3-9-70	3-16-71	Iran Airlines	12-31-25	45
34.			"	"	3-17-66	3-17-71	Pan American	7-26-19	47
35.			"	"	11-5-68 8-6-69	12-7-71	Capital Airways	7-18-13	55
36.			"	"	6-29-70	6-28-73	Northeast Airlines	4-8-20	50
37.			"	"	12-22-71 10-11-72 6-26-74	11-8-73 5-14-79	Northwest Airlines	8-23-12	59
38.			"	"	12-11-73 10-17-74	1-6-75	Saturn Airways	2-14-23	50

	Name	PI#	Class	Defect	Date of Exemption	Date Term.	Airline	Date of Birth	
39.			2	Myocardial Infarction	5-4-66		American Airlines	9-7-19	47 Deceased
40.			"	"	4-16-69		Pan American	10-20-14	55 Deceased
41.			"	"	9-10-76 6-30-77		T.W.A.	7-22-40	36
42.			"	"	12-27-79		American Airlines	11-7-23	56
43.			"	"	12-6-79		American Airlines	3-2-30	49
44.			"	"	1-9-80		T.W.A.	1-27-22	58
45.			"	"	11-9-78		American Airlines	10-23-29	49
46.			"	"	1-23-79		T.W.A.	7-7-24	55
47.			"	"	3-5-79		National Airlines	6-4-29	50
48.			"	"	3-21-80		Flying Tiger Airlines	8-29-38	42
49.			"	"	12-6-79		United Airlines	11-12-39	40
								AVERAGE AGE	
									49.143

	Name	PI#	Class	Defect	Date of Exemption	Date Term.	Airline	Date of Birth	
1.			1	Disturbanc of consciou	6-30-77		Pan American	6-3-34	43
2.			"	Cerebral Aneurysm	10-21-76		Continental Airlines	12-5-25	51
3.			"	Carotid arty aneurysm	4-28-72 1-10-74		Western Airlines	10-29-37	35
4.			"	Psychotic disorder	3-2-72		Ethiopian Airlines	5-16-30	42
5.			"	Mental disorder	6-17-77		Texas Eastern Airlines	11-14-25	52
6.			"	Fibromatosis of neck	10-5-72 11-11-76	3-5-79	Hughes Air West	9-3-31	41
7.			"	Hodgkins disease	11-12-76		Braniff Int'l.	12-12-39	37
8.			"	Disturbance of consciou.	10-5-72 4-19-76		United Airlines	4-3-21	51
9.			"	Cardiovascular disease	4-10-73 4-21-76	3-19-80	Delta Airlines	6-1-30	43
10			"	Carotid endarterectomy	11-12-76		Delta Airlines	4-26-21	55
11			"	Defective hearing	9-4-75		Ethiopian Airlines	7-4-47	28
12			"	Disturbance of consciou.	3-7-77		Scenic Airlines	8-24-48	29
13			"	Nervous condition	10-24-75 6-30-77		T.W.A.	7-25-41	34
14			"	Disturbance of consciou.	7-21-72		T.W.A.	6-24-37	35
15			"	Neuro. cond., abn. EKG	10-29-71		Allegheny Airlines	6-30-39	32
16			"	Psychosis	3-4-77		Airlift Int'l.	9-9-25	52
17			"	LBBB	5-22-72		United Airlines	8-3-26	46
18			"	Neuro. condition	4-3-73		Eastern Airlines	2-5-34	39
19			"	Retained calculi	12-27-76		T.W.A.	4-9-30	46

	Name	PI#	Class	Defect	Date of Exemption	Date Term.	Airline	Date of Birth	
20.			1	Pituitary adenoma	11-13-73		Braniff Int'l.	12-6-40	33
21.			"	Coronary heart dis.	1-10-67		Yemen Airways	7-14-18	49
22.			"	Psychotic disorder	3-13-70	10-19-79	Western Airlines	2-24-40	30
23.			2	Angina pectoria	2-9-73		Pan American	4-16-20	53
24.			"	Cerebrovas. accident	11-30-76		American Airlines	5-20-21	55
25.			"	Angina pectoris	7-12-63 4-10-69		T.W.A.	4-25-18	45
26.			"	Angina pectoris	6-22-73		Pan American	9-24-21	52
27.			"	Angina pectoris	9-21-76		United Airlines	8-6-39	37
28.			"	Aortic aneurysm	5-18-73		Eastern Airlines	2-23-23	50
29.			1	Psychosis	12-30-76		Eastern Airlines	9-8-27	49
30.			"	Disturbance of consciou.	7-28-70	8-11-77	Pan American	11-16-27	43
31.			"	Bone & joint disease	11-7-68	4-23-69	Pan American	11-1-19	49
32.			"	Cardiovascular disease	10-10-69	10-7-76	Continental Airlines	2-6-21	48
33			"	Angina and diabetes	9-3-75		Southern Airways	1-3-24	51
34			"	Disturbance of consciou.	6-27-79		Eastern Airlines	2-5-42	37
35.			"	Disturbance of consciou.	7-24-79		Western Airlines	4-19-44	35
36.			"	Drug dependence	12-11-79		National Airlines	4-5-36	43
37.			"	Mitral valve repair	12-11-79		Texas Int'l. Airlines	5-27-27	52
38.			"	Subarachnoid hemorrhage	12-27-79		Republic Airlines	10-19-31	48

	Name	PI#	Class	Defect	Date of Exemption	Date Term.	Airline	Date of Birth	
39			1	Disturbance of consciou.	1-18-80		United Airlines	5-6-23	57
40			"	Neurological disorder	3-21-80		American Airlines	8-4-36	44
41			"	Neuro & eye disorders	4-30-80		Delta Airlines	4-4-39	41
42.			1	Psychosis	11-15-78	5-18-81	Republic Airlines	5-30-41	37

AVERAGE AGE
31.8095

Name	PI#	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
		2	Alcoholism	2-12-25	1-17-77	12-29-77	0-30-78		5
		1	"	11-1-26	5-20-76			11-30-81	5
		1	"	4-21-21	7-7-76				5
		1	"	6-11-29	3-27-79			7-31-81	5
		1	"	6-20-23	2-24-81			4-30-81	58
		1	"	6-5-36	10-2-79	4-29-80			43
		1	"	2-3-35	10-9-80			11-30-81	41
		1	"	11-4-32	3-21-78			4-30-81	46
		2	"	7-1-25	10-30-78			9-30-81	53
		1	"	8-23-25	3-2-78			11-30-81	53
		1	"	9-7-21	10-9-80			10-31-81	59
		1	"	9-24-29	7-22-77			8-31-81	49
		1	"	11-26-29	12-21-77			7-31-81	48

Name	PI#	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
		1	Alcoholism	6-3-21	6-23-78			7-31-81	57
		1	"	6-20-32	2-14-80			7-31-81	48
		1	"	2-24-44	2-15-79			8-31-81	35
		1	"	12-24-31	Class 2 8-11-77	Upgraded to Class 1	3-23-78	7-31-81	46
		1	"	5-15-28	1-22-81			10-31-81	53
		1	"	7-29-40	4-16-79			9-30-81	39
		1	"	3-25-39	7-12-79			7-31-81	40
		1	"	9-10-35	1-9-79	7-28-80			44
		1	"	12-14-22	4-19-78				56
		1	"	12-23-35	8-11-78	8-29-80			43
		1	"	1-2-36	8-29-75	6-23-76			39
		1	"	11-17-34	11-2-77			7-31-81	43

Name	PI#	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
		1	Alcoholism	-2-34	-24-79			9-30-81	45
		1	"	4-11-31	2-27-76			5-31-81	15
		1	"	10-10-22	12-1-77			12-31-81	
		1	"	9-29-35	11-17-77			6-30-81	56 1634
		1	Psychosis Alcoholism	6-27-35	10-30-79			2-28-81	44
		1	Alcoholism	7-1-22	11-20-80			10-31-81	
		1	Alcoholism	4-30-39	1-18-78				
			—	–					
		1	"	3-10-18	6-17-77				
		1	diabetes alcoholism [illegible]	8-29-33	-2-76			8-31-81	
			—						
		2	Alcoholism	3-31-20	1-23-79	7-9-79			
		2	"	6-22-25	3-31-78	7-31-78	10-22-7		

Name	PI#	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
		1	Alcoholism	7-10-22	5-2-77			10-31-81	
		1	"	3-31-32	6-12-79			10-31-81	
		1	hypertension Alcoholism	7-13-20	1-25-78				
		1	Alcoholism	6-24-39	10-22-79			9-30-81	
		1	"	1-24-39	1-3-79	8-8-80			
		1	"	6-26-41	10-9-80			5-31-81	
		1	"	12-13-41	7-23-79			12-31-81	
		1	"	3-23-28	1-18-80			12-31-81	
		2	"	2-6-29	6-27-79			4-30-82	
		1	"	4-5-22	4-7-80	9-19-80			
		1	"	5-16-21	2-1-77			8-31-81	
		1	"	1-6-39	10-22-79			8-31-81	
		1	hypertension alcoholism	12-5-27	10-21-80			10-31-81	
		1	Depression Alcoholism	6-19-28	6-25-74			6-30-81	

Name	PI#	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
		1	Alcoholism	6-5-21	10-2-72			6-30-81	
		1	"	7-6-31	5-23-77			6-30-81	
		1	"	6-26-30	4-20-79				
		1	"	12-6-17	10-6-77	Class 3 8-17-78	Class 1 11-27-79		
		1	"	11-26-34	5-5-76	11-5-76	12-8-76	7-31-81	
		1	"	11-2-24	9-20-79			12-31-81	
		1	"	1-13-34	2-7-73			10-31-81	
		1	"	11-30-39	4-15-77	7-31-78	4-16-79		
		1	"	7-19-32	1-22-73	6-6-80			
		1	"	3-26-25	10-6-78	1-28-81			
		1	Alcoholism	10-10-35	11-28-80			6-30-81	

Name	PI#	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
		1	Alcoholism	9-6-29	9-15-78			7-31-81	
		1	"	8-28-38	10-21-80			11-30-81	
		1	"	11-26-27	1-9-78			7-31-81	
		1	"	10-12-38	6-28-78			6-30-81	
		1	"	9-23-27	7-17-79			10-31-81	
		1	"	10-21-32	1-27-77			9-30-81	
		2	"	6-30-28	6-15-78			6-30-82	
		1	"	3-10-43	7-17-79			10-31-81	
		1	"	7-10-22	1-6-77			7-31-81	
		1	"	10-28-34	3-19-80			9-30-81	
		1	"	8-17-31	12-1-77	2-9-79	6-27-79		
		1	"	2-12-31	9-2-77	5-19-78	10-10-78		

Name	PI#	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
		1	Alcoholism	2-9-44	6-19-78	10-29-79			
		1	"	10-31-32	2-4-81			11-30-81	
		1	"	5-11-35	5-26-78			12-31-81	
		1	"	11-1-19	3-8-78			6-30-81	
		1	"	5-19-32	7-26-77			11-30-81	
		1	"	12-17-22	11-13-80			5-31-81	
		1	"	5-11-37	7-23-79			12-31-81	
		1	"	2-17-33	9-21-78			9-30-81	
		1	"	1-23-30	1-16-78			11-30-81	
		1	"	1-31-37	10-18-77	8-21-78	10-19-78		
		1	"	9-17-29	10-9-80			10-31-81	
		1	"	5-27-34	1-19-78			11-30-81	
		1	"	11-25-34	3-5-81			5-31-81	
		1	"	3-7-21	4-28-77			3-31-81	

Name	PI#	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
		1	Cataract surg. Alcoholism	11-9-32	3-31-78			5-31-81	
		1	Alcoholism	3-14-31	3-25-81			11-30-81	
		1	Hypertension Alcoholism	2-7-38	5-4-77			3-31-82	
		1	Alcoholism	11-16-24	11-1-77			11-30-81	
		1	"	6-15-21	5-31-77				
		1	"	12-23-36	10-8-76	5-4-77	12-23-77		
		1	"	2-28-39	3-8-77	2-23-79			
		1	"	11-6-34	9-26-79			7-31-81	
		1	"	2-22-21	8-10-77			9-30-80	
		1	"	6-13-30	8-27-79			7-31-81	
		1	"	9-15-18	10-15-73				

Name	PI#	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
		2	Alcoholism	3-31-40	0-17-78			11-30-81	
		1	"	4-10-40	1-13-81			1-31-82	
		1	"	2-26-24	-10-77				
		1	"	2-26-22	9-18-72	11-19-76			
		1	"	0-20-38	2-18-79			10-31-81	
		1	"	5-21-36	-3-79			5-31-81	
		2	"	11-20-34	2-19-81			10-31-81	
		1	Hypertensio Alcoholism	-31-24	-7-75			8-31-81	
		1	"	7-1-21	8-11-77				
		1	"	10-7-33	0-21-80			12-31-81	
		1	erson. dis. lcoholism	-19-40	3-6-76			12-31-81	
		1	Alcoholism	1-13-33	11-28-80			10-31-81	
		1	Dist. cons. nervous con alcoholism	8-31-33	11-10-76			4-30-81	
		1	Alcoholism	12-11-31	10-8-80				
		1	"	0-25-35	8-16-78			5-31-81	
		1	"	9-28-33	4-29-80			8-31-81	

Name	PI#	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
		1	Alcoholism	11-29-37	7-23-79			12-31-81	
		1	"	4-21-39	10-18-78	4-12-79			
		1	"	2-27-40	11-6-78			10-31-81	
		1	"	11-7-23	4-4-80			10-31-81	
		1	"	6-25-23	11-7-78			12-31-81	
		1	"	4-3-24	3-31-77	5-2-78	5-4-78		
		1	"	7-24-38	3-19-80			7-31-81	
		1	"	10-30-38	4-18-79			8-31-81	
		1	"	3-24-20	5-31-77				
		1	"	12-14-33	3-31-77	1-27-78			
		1	"	5-21-28	5-1-80			10-31-81	
		1	"	4-11-22	4-19-78	12-6-79			
		1	"	1-13-38	4-18-78			9-30-81	

PI#	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
	1	Alcoholism	2-8-21	2-27-79				
	1	"	12-2-39	1-2-80			9-30-81	
	2	"	12-16-28	1-12-79			3-31-82	
	1	"	3-22-20	1-12-79				
	1	"	4-8-24	11-13-80			9-30-81	
	1	"	8-8-41	10-8-76			10-31-81	
	1	"	2-1-43	10-15-80			1-31-82	
	1	"	2-15-29	10-18-78				
	1	"	11-4-28	9-19-77			8-31-81	
	1	"	11-9-38	10-21-80			9-30-81	
	1	"	12-28-24	8-23-76	2-10-77	8-17-78		
	1	"	4-6-23	6-3-74	6-27-78	6-28-78		
	1	"	11-15-30	1-12-79			8-31-81	

Name	PI#	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
		1	Alcoholism	5-3-41	7-13-78			10-31-81	
		1	"	12-11-32	5-26-78			9-30-81	
		1	"	3-17-33	4-6-78	12-14-78			
		2	"	6-16-21	3-23-77			3-31-82	
		1	"	2-19-42	6-23-76	1-14-81	1-14-81	9-30-81	
		1	"	7-21-22	8-17-76			7-31-81	
		1	Cardiac & Alconolism	3-7-31	4-29-81			11-30-81	
		1	Drug depend. Alcoholism	2-13-26	5-22-79			2-28-81	
		1	"	8-27-29	8-27-79			8-31-81	
		1	"	12-24-25	9-17-80			9-30-81	
		1	"	8-23-35	2-24-78			8-31-81	
		1	"	4-7-44	11-26-80			10-31-81	
		1	"	5-17-22	3-21-78				

PI#	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
	1	Alcoholism	1-14-32	5-20-72			3-31-81	
	1	Alcoholism	7-19-29	4-24-81			11-30-81	
	2	"	5-23-21	2-24-78			10-31-81	
	1	"	12-31-34	3-22-76			10-31-81	
	1	"	5-21-29	-18-80			12-31-81	
	1	"	7-14-34	-10-80			11-30-81	
	1	"	11-21-41	-12-79			10-31-81	
	1	"	4-6-36	10-21-80			10-31-81	
	1	"	7-24-35	10-20-78			8-31-81	
	1	"	7-7-38	-13-78			2-28-81	
	1	"	3-10-36	1-14-61			8-31-81	
	1	"	1-6-22	-27-78			9-30-81	
	2	"	-17-29	6-19-79	4-19-80			

Name	PID	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
		1	Hypertensio Alcoholism	5-12-20	5-24-77	4-11-80			
		2	Alcoholism	1-13-22	1-27-78			12-31-81	
		1	"	9-3-39	3-27-78	3-9-79			
		1	"	7-14-31	10-6-78				
		1	"	4-21-28	4-11-77			12-31-81	
		1	"	5-30-33	1-30-80			11-30-81	
		2	"	9-10-30	8-8-78			11-30-81	
			—						
		1	"	4-16-36	6-12-79			10-31-81	
		1	"	1-1-35	4-16-79			8-31-81	
			—						
		2	Hypertensio Alcoholism	11-1-23	5-19-78			7-31-81	
		1	Alcoholism	1-17-38	7-5-78			1-31-81	

PID	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
	1	Alcoholism	3-25-22	10-21-77	Cancelled 11-80			
	1	"	12-31-24	10-9-80	12-10-80			
	1	"	5-7-39	12-18-79			11-30-81	
	1	"	9-16-22	2-22-80			12-31-81	
	1	"	1-2-36	3-21-78			7-31-81	
	1	"	5-12-21	8-31-78			11-30-81	
	1	"	9-28-35	1-2-81			9-30-81	
	1	"	11-6-36	7-19-78			8-31-81	
	1	"	6-18-24	3-3-80			12-31-81	
	1	"	11-26-29	12-17-76			10-31-81	
	1	"	10-9-25	10-21-80			10-31-81	
	1	"	11-22-17	6-7-74				
	1	"	7-17-24	1-13-78			12-31-81	
		—						
	1	"	6-23-23	11-7-78			10-31-81	
	1	"	3-16-20	10-17-78			10-31-81	

Name	PI#	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
		1	Alcoholism	6-19-20	5-8-78			6-30-81	
		1	Hypertension Alcoholism	7-8-20	12-5-77			9-30-80	
		1	Alcoholism	9-15-26	11-16-77	10-4-78	10-19-78	8-31-81	
		1	"	4-12-31	2-25-76			8-31-81	
		1	"	1-11-28	6-23-76	11-23-77	6-23-79	12-31-81	
		1	hypertension alcoholism	12-13-27	10-21-80			4-30-81	
		1	"	8-12-38	2-15-79	6-5-79	9-25-80	8-31-81	
		1	"	11-19-26	10-21-80			11-30-81	
		1	"	11-22-23	3-8-77			8-31-81	
		1	"	6-8-30	3-5-81			9-30-81	
		1	"	11-11-33	10-30-78			10-31-81	
		1	"	9-27-22	5-8-78			4-30-81	
		1	"	11-11-19	3-29-78	6-7-79			

PI#	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
	1	Alcoholism	5-30-21	3-2-79			9-30-81	
	1	"	5-20-36	11-29-78			1-31-81	
	1	"	10-11-21	8-30-79			6-30-81	
	1	"	1-15-28	1-23-79	6-13-79			
	1	"	7-15-42	1-2-81			9-30-81	
	1	"	8-24-21	4-12-78			10-31-81	
	1	"	2-3-21	1-16-78			9-30-81	
	1	"	7-16-33	Class 2 8-30-76	Upgraded to Class 1	12-7-78	3-31-82	
	1	"	3-12-19	2-14-78			2-28-82	
	1	"	9-27-25	8-17-77				
	1	"	10-30-22	10-22-76	11-22-77	12-1-77	12-31-81	

Name	PID	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
		1	Alcoholism	12-17-40	4-21-77			3-31-81	
		1	"	1-19-27	4-5-77			8-31-81	
		1	"	4-12-35	7-17-79			12-31-81	
		1	"	9-7-37	3-21-78			2-28-81	
		1	"	6-20-32	10-9-80			11-30-81	
		1	"	1-17-35	3-8-77			9-30-81	
		1	"	6-20-43	3-9-79			8-31-81	
		1	"	8-9-21	7-23-79			9-30-81	
		1	"	3-13-24	10-9-80			4-30-81	
		1	"	6-2-38	1-18-80			12-31-81	
		1	"	12-5-22	9-15-78			1-31-81	
		1	"	3-31-31	1-9-80			10-31-81	

Name	PIØ	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
		1	Hypertension Alcoholism	4-24-24	12-3-75			12-31-81	
		1	"	6-29-22	12-18-79			11-30-81	
		1	"	6-10-35	10-28-80			10-31-81	
		1	"	12-12-24	7-7-78			12-31-81	
		1	Carcinoma Alcoholism	9-22-24	6-13-77			2-28-81	
		1	Hypertension Alcoholism	9-3-17	6-14-72				
		1	"	2-5-29	9-15-78			4-30-81	
		1	"	1-4-28	8-11-78			10-31-81	
		1	"	7-10-36	11-2-77			4-30-81	
		1	"	9-24-21	8-31-77	6-9-81			
		1	"	6-28-26	6-23-77	7-16-79			
		1	"	11-13-23	3-18-80			1-31-82	

PID	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
	1	Alcoholism	12-28-30	11-9-79			10-31-81	
	1	"	8-7-33	8-1-78			8-31-81	
	1	"	1-5-28	6-2-78			12-31-81	
	1	"	12-5-29	4-4-80			8-31-81	
	1	"	10-11-26	2-15-79			10-31-81	
	1	"	10-22-36	4-13-81			10-31-81	
	1	"	9-12-44	5-14-79			12-31-81	
	1	"	9-2-46	2-22-80				
	2	Drug depend. Alcoholism	10-27-20	8-16-78	4-27-79	4-27-79	12-31-81	
	1	Alcoholism	7-15-31	6-29-78			9-30-81	
	1	"	2-23-24	6-17-77			12-31-81	
	1	"	2-4-29	1-16-78			5-31-81	
	1	"	9-27-29	Class 2 9-15-77	Upgraded to Class 1	12-6-78	7-31-81	

Name	PI#	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
		1	Alcoholism	7-1-39	5-8-79			5-31-81	
		1	"	6-3-35	7-13-78	10-7-80			
		1	"	4-2-22	11-15-78			10-31-81	
		1	"	11-26-29	2-15-79			7-31-81	
		1	"	2-11-33	10-6-78			7-31-81	
		1	"	3-7-23	8-8-78			11-30-81	
		1	"	9-16-25	1-2-80			12-31-81	
		1	"	1-2-43	10-15-80			9-30-81	
		1	"	12-4-23	5-26-78			9-30-81	
		1	"	6-19-25	9-12-77			8-31-81	
		1	"	12-6-28	2-14-80			12-31-81	
		1	Neuro. cond Alcoholism	9-25-40	1-17-77			6-30-81	

Name	PIØ	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
		1	Alcoholism	7-20-40	7-27-77			6-30-81	
		1	"	3-23-33	1-2-81			4-30-81	
		1	"	9-6-37	2-28-79			8-31-81	
		1	"	1-6-42	11-5-79			10-31-81	
		1	"	5-20-36	10-15-80			10-31-81	
		1	"	5-9-26	1-3-77			6-30-81	
		1	"	8-18-39	6-10-81			12-31-81	
		1	"	6-25-34	6-17-77			10-31-81	
		1	"	7-18-24	4-12-78				
		1	"	2-18-24	5-7-79			10-31-81	
		1	Hypertension Alcoholism	9-4-27	6-2-77	1-3-80			
			—						
		1	Alcoholism	2-14-40	11-5-79			8-31-81	
		1	"	2-7-34	10-9-80			9-30-81	
		1	"	5-3-22	6-16-76	1-11-79	9-12-79	8-31-81	
		1	"	3-20-24	10-15-80			11-30-81	

PID	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
	1	Alcoholism	0-7-34	1-18-80			7-31-81	
	1	"	11-28-25	8-17-77			7-31-81	
	1	"	12-6-32	9-15-78			8-31-81	
	1	"	4-9-42	12-5-80			7-31-81	
	1	"	3-6-31	0-15-78			9-30-81	
	1	"	9-12-32	0-6-78			7-31-81	
	1	"	6-2-23	-4-76	6-3-77			
	1	"	2-4-39	1-15-78			9-30-81	
	1	Neuro. cond Alcoholism	3-23-37	-30-77	1-12-78	1-12-78	5-31-81	
	1	Alcoholism	2-13-38	3-13-78	12-14-78			
	2	"	5-27-18	10-18-77				

Name	PI#	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
		1	Alcoholism	9-19-34	5-7-76			10-31-81	
		1	"	8-21-20	4-16-79			10-31-81	
		1	"	10-18-23	10-9-75	7-7-78	4-4-80	10-31-81	
		1	"	12-3-24	8-31-78			9-30-81	
		1	"	11-3-41	8-27-79			7-31-81	
		1	"	10-3-19	6-7-78				
		1	"	9-10-17	6-30-77				
		1	"	12-30-21	9-15-78			9-30-81	
		1	"	1-26-40	1-30-80			11-30-81	
		1	"	3-20-34	2-11-77	7-20-78	7-24-78	6-30-81	
		1	"	11-3-22	8-10-77	3-12-80			

Name	PI#	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
		1	Alcoholism	7-1-34	3-3-77			11-30-81	
		1	"	12-25-23	1-12-78	10-4-79			
		1	"	9-22-25	3-17-76	3-30-79			
		1	"	6-1-46	3-7-78			7-31-81	
		1	"	8-27-29	1-27-77	7-16-79			
		1	"	6-19-37	9-20-79			9-30-81	
		1	"	7-20-38	9-30-77	9-18-79	1-12-81		
		1	Angina & Alcoholism	4-5-29	9-20-77	6-5-79			
		1	Alcoholism	2-16-34	7-14-76			8-31-81	
		1	"	9-28-32	5-5-76			11-30-81	

Name	PI#	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
		1	Alcoholism	3-3-24	1-9-79			3-31-81	
		1	"	9-4-21	11-3-80			12-31-81	
		1	"	1-19-21	6-8-76				
		1	"	1-25-25	4-16-79				
		1	"	8-19-41	6-9-78			5-31-81	
		1	"	1-29-34	6-15-78			9-30-81	
		1	"	6-9-36	3-13-80	12-22-80			
		1	"	1-18-32	5-26-78			7-31-81	
		1	"	12-10-45	5-24-77	8-31-77			
		1	"	10-22-25	4-27-78			9-30-81	
		1	"	2-9-28	5-20-77			11-30-81	
		1	"	12-17-40	8-17-76			12-31-81	

Name	PI#	Class	Defect	Date of Birth	Date Granted	Date Terminated	Date Granted	Certified To:	Remarks:
		1	Alcoholism	1-2-24	6-6-79			12-31-81	
		1	"	4-10-24	1-18-80			9-30-81	
		1	"	9-21-29	11-7-78			10-31-81	
		1	"	6-29-41	2-11-77	2-24-78	1-27-79		

APPENDIX 5

[Western Union Mailgram]

Capt. HOWARD ARONSON,
New Canann, CT.

Hon. EDWARD R. ROYBAL,
Chairman, House Select Committee on Aging,
Washington, DC.

DEAR CONGRESSMAN ROYBAL: I am a captain with a major air carrier, as well as a longtime member of ALPA. I am a firm advocate of changing the FAA age 60 rule to allow pilots to fly past age 60 as pilots in command. I am aware that this view puts me at odds with the stand of ALPA, however, I feel that in this case the position of my union is not a valid one. There is absolutely no reason why a pilot, if physically, mentally and proficiently qualified, cannot remain at the controls of an airliner after his 60th birthday, the original age 60 ruling was not based on medical or scientific data but rather a dictate by the then FAA administrator in the late 1950's. I hope your committee will be able to have this arbitrary rule changed to prevent this discriminatory practice. Thank you for your consideration.

Sincerely,

Capt. HOWARD ARONSON.

AIRCRAFT OWNERS AND PILOTS ASSOCIATION,
February 20, 1985.

DONALD ENGEN,
Administrator, Federal Aviation Administration,
Washington, DC 20591

DEAR DON: This concerns the meeting which you attended with Congressman Ed Roybal, Chairman of the House Select Committee on Aging, concerning the Age 60 Rule.

The meeting was attended by two representatives from AOPA. They have reported to me the outcome of the meeting. I feel that it is appropriate at this time to outline AOPA's position concerning the possibility of granting exemptions from the rule. AOPA would support the granting of exemptions to the Age 60 Rule if an adequate medical examination protocol can be established to determine an individual airline pilot's medical qualifications to continue flying. We see no reason why an experienced pilot who remains medically qualified should not be allowed to continue to fly beyond the age of 60.

I understand that you voiced a concern that a project of this type could add to the Federal Air Surgeon's already heavy backlog of exemption cases. I certainly appreciate your concern in this area and AOPA appreciates Dr. Austin's efforts to reduce that backlog. I would be happy to discuss your concerns with you if you feel that it would be helpful.

Thank you for considering our views.

Sincerely,

JOHN L. BAKER, *President.*

Air Line Pilots Association,
Washington, DC, May 10, 1985.

Hon. Edward R. Roybal,
Chairman, Select Committee on Aging,
House of Representatives, Washington, DC.

Dear Mr. Chairman: This is in response to your letter to Captain Henry Duffy dated March 19, 1985. I'm attaching the official position of the Association on the Age 60 rule. This was established by the Board of Directors of the Association in 1980. There has not been a change of policy since that time.

The Association renders it inappropriate to comment further on questions of age discrimination at the moment, since the case of *Western Air Lines, Inc.* v. *Criswell, et al.*, No. 83-1545, now pending before the U.S. Supreme Court, will determine some fundamental unresolved questions about current statutory interpretation.

Thank you for your continued interest in this vital subject.

Sincerely,

Paul L. Hallisay, *Director, Legislative Affairs.*

Section 55 Retirement and Insurance, 55.03.01

AGE 60

A. Age 60 Policy

Source—Board 1980

Since virtually all flight deck crew members now in active service have shaped their professional careers based upon retirement at age 60, and since essentially required working agreements, seniority and retirement plans have been based on that retirement age, and any modification of required pilot retirement at age 60 presents serious problems of undesirable impact in the areas of: (a) medical standards and examinations, (b) equal applicability to all flight deck crew members, and (c) job security, established job equities and promotional opportunities, ALPA:

1. Endorses required retirement at age 60 for all flight deck crew members.
2. Shall take affirmative steps required to confirm such retirement age and that same applies uniformly to all flight deck crew members.
3. Shall take action with respect to regulations, legislation or otherwise to assure that there shall be no impairment of pilot rights in respect of medical standards and examinations, job security, established job equities and promotional opportunities and that this shall apply equally to all flight deck crew members.
4. Rescinds all prior language with respect to mandatory retirement age.
5. Full consideration shall be given to the improvement of retirement and related benefits for flight deck crew members approaching or, now on retirement.

B. Age 60 (Downbidding)

Source—Board 1978

So long as the Age 60 Regulation remains in force, ALPA shall, acting legally and with respect to the rights of all, take all necessary steps by negotiations, legal or other action, as required, to assure a determination that any bona fide occupational qualification limitation shall apply uniformly and without discrimination to all flight crew members.

C. Age 60 Retirement (Downbidding to Second Officer)

Source—Executive Board May 1978

Grievance to enforce downbidding to Second Officer position in opposition to provisions of collective bargaining agreements or pension plans shall not be pursued or supported by ALPA.

D. Social Security

Source—Board 1978

ALPA shall continue its effort to provide for commencement of Social Security benefits upon any federally-mandated retirement date. Negotiating Committees are encouraged to negotiate protective provisions to cover pilots between the federally mandated retirement date and the date Social Security benefits may begin. Further, Negotiating Committees are encouraged to eliminate Social Security integration in any form from pilot pension plans through negotiations.

AIR LINE PILOTS ASSOCIATION,
Washington, DC, August 12, 1985.

Hon. EDWARD R. ROYBAL,
Chairman, Select Committee on Aging,
House of Representatives, Washington, DC.

DEAR MR. CHAIRMAN: I am in receipt of your letter dated July 22, in which you once again solicit the views of the Association on the FAA's Age 60 rule.

In light of recent Supreme Court decisions, our Board of Directors will be conferring with counsel to evaluate the effects upon our present policy. However, the Board will not meet again until next year. Until then, it would be inappropriate for me to comment on the matter.

If I can provide you with any additional information please contact me.

Sincerely,

HENRY A. DUFFY, *President.*

HOUSE OF REPRESENTATIVES,
SELECT COMMITTEE ON AGING,
Washington, DC, October 2, 1985.

Captain HENRY DUFFY,
President, Air Line Pilots Association, International,
Washington, DC.

DEAR CAPTAIN DUFFY: The House Select Committee has scheduled a hearing into the Federal Aviation Administration Age 60 Rule for commercial airline pilots. The hearing is tentatively scheduled for Thursday, October 17, 1985, at 10:00.

The hearing is planned as a follow-up of the study conducted by the National Institute on Aging in 1980 and '81. We plan to investigate the continued need for an age limit for airline pilots and whether the medical rules for monitoring and evaluating airline pilots are adequate in light of modern technology.

In order to produce a full record in this matter, the participation of your Association would be helpful. In order to expedite the proceedings, we are asking that all participants be identified and submit a written statement for the record by Friday, October 11, 1985. We further ask that each participant summarize their remarks at the time of the hearing. If, for any reason, you will not be able to participate as a witness or do not plan to have someone participate for the Association, we would appreciate a letter from you to that effect by October 15, 1985.

If you have any further questions, please contact Mr. Roger Thomas of my staff at 202/226-3375.

Sincerely,

EDWARD R. ROYBAL, *Chairman.*

AIR LINE PILOTS ASSOCIATION,
Washington, DC, October 16, 1985.

Hon. EDWARD R. ROYBAL,
Chairman, Select Committee on Aging,
House of Representatives, Washington, DC.

DEAR MR. CHAIRMAN: This is in response to your letter of October 2, 1985 in which you invite our Association to testify before your Committee on the Age 60 rule.

We appreciate the Committee's invitation but most respectfully decline. The position of the Association in support of the Age 60 rule has not changed since the issue was last addressed by the Congress in 1979.

Please be assured that we are prepared to comment on any specific legislative proposal designed to effectuate a change in the Age 60 rule.

Sincerely,

HENRY A. DUFFY, *President.*

PREPARED STATEMENT OF CAPTAIN HENRY A. DUFFY, PRESIDENT, AIR LINE PILOTS ASSOCIATION

The Air Line Pilots Association represents the professional interests of more than 34,000 airline pilots employed by 49 U.S. airlines. Our Association has long had an interest in the FAA's Age 60 rule, therefore, we appreciate the opportunity to present our views to the committee.

In 1979, we testified before this Committee and presented detailed testimony on our historic involvement with the subject of mandatory retirement. That statement is part of the record and is contained in Committee Publication Number 96-183. Therefore, this statement will instead discuss our present position and its development since the subject was last addressed by the Congress in 1979.

The House of Representatives debated the Age 60 rule on December 7, 1979. During floor deliberation of H.R. 3948, ALPA supported an amendment offered by Congressman Jim Howard that charged the National Institute of Health with conducting a study of the medical and performance implications of pilot aging, and whether safety would be adversely affected by changing the retirement age. The amendment in the form of a substitute passed by the House. Senate action followed and on December 8, 1979, H.R 3948 passed the Senate.

Pursuant to Public Law 96-171, the National Academy of Science Institute of Medicine (NAS/IOM) study panel, which included ALPA's Aeromedical Advisor, Dr. Richard L. Masters, conducted a thorough review of the subject. The NAS/IOM report, already a work of distinguished scientists, then received prompt review by another body of equally eminent scholars at the National Institute of Aging (NIA). Despite their considerable efforts, these expert panels were unable to justify striking down the rule, largely because they were unable to demonstrate with a reasonable degree of certainty that abandoning the rule would not cause increased risk. Futher, while establishing a testing protocol might be seen to be preferable to using chronology for a cutoff, they were unable to show that it could be done within the constraints of scientific knowledge, discipline and practice. The impressive weight of medical opinion clearly supports the fact that medical tests, broadly speaking, often are not designed or intended to be predictive; nor can statistical information pertaining to population groups safely be extrapolated to individual predictability. It is not possible to reliably apply available medical tests to the numerous body systems that must be tested under any projected program with an outcome of safe or realistic predictability. Simply, the tools are not sufficiently developed to dissect this question into its components and accurately measure the parts.

The NAS/IOM report (March, 1981) raised numerous questions which the panel felt could only be resolved by extensive further research. There are references to 15 to 20 needed research subjects in the body of the report, and Chapter 14 itself is entitled "Needs and Opportunities for Research". To our knowledge, nothing has been accomplished along these lines.

The results of extensive evaluation in 1980-1981 concluded that there was, at that time, insufficient evidence upon which to base a change in the Age 60 rule.

In November of 1980, the ALPA Board of Directors met in Los Angeles. A report was presented by the Association's Age 60 Committee. The Committee had monitored and participated in the NAS/IOM study. The Age 60 issue was once again the subject of a lengthy debate by the delegates assembled. The Board passed the following resolution.

"Since virtually all flight deck crew members now in active service have shaped their professional careers based upon retirement at age 60, and since essentially required working agreements, seniority and retirement plans have been based on that retirement age, and any modification of required pilot retirement at age 60 presents serious problems of undesirable impact in the areas of: (a) medical standards and examinations, (b) equal applicability to all flight crew members, and (c) job security, established job equities and promotional opportunities, ALPA:

"1. Endorses required retirement at age 60 for all flight deck crew members.

"2. Shall take affirmative steps required to confirm such retirement age and that same applies uniformly to all flight deck crew members.

"3. Shall take action with respect to regulations, legislation or otherwise to assure that there shall be no impairment of pilot rights in respect of medical standards and examinations, job security, established job equities and promotional opportunities and that this shall apply equally to all flight deck crew members."

Since our Board and the Congress last addressed the issue, there have also been a number of technological changes in the industry that should be thoroughly addressed in considering whether a change in the Age 60 rule is now appropriate. Most significantly is the two-pilot cockpit configuration in new technology commercial aircraft such as the Boeing 757 and 767, thereby substantially reducig crew redundancy and degrading the concept of the "fail-safe" crew.

In July of 1981, the report of the President's Task Force on Aircraft Crew Complement stated, "in our view there is nothing in the size of aircraft per se that requires a flight crew larger than 2 persons." Thus all aircraft certificated since that time have been approved with a crew of two.

The issue of the age of airmen flying passengers for U.S. air carriers was never considered by the President's Task Force because it was a known fact of regulatory policy that Part 121 air carrier pilots were required to retire at age 60. Had the issue of the change in policy regarding other pilots at the controls of our airliners been considered by the Task Force, its recommendation may have taken a completely different turn. The Task Force leaned heavily on the facts of the then current accident record which was based on a system in which pilots retired at age 60.

With the decision of the President's Task Force on Crew Complement, the aircraft industry rushed to retool the production lines to a predominently two-crew aircraft production. More recently the effect of the two-crew system has been reflected in discussions of the new two-engine, two-crew overwater flights, and has been the subject of special waivers by the FAA to test these conditions in North Atlantic operations. If airline pilots were permitted to continue to fly beyond age 60, many would find their way into these operations because the number of two-crew, two-engine overwater operations is forecasted to increase. Since the more senior (and older) pilots enhance their retirement benefits by selecting the international routes, it follows that the older group of pilots would select the international flying.

In testimony before the House Aviation Subcommittee on July 19, 1979, Captain Jack Young stated, " . . . in the rare event of sudden incapacitation of a pilot the rest of the crew is available to immediately take over operations of an aircraft in accordance with the established procedures. This 'fail-safe crew' concept adds an extra element of safety to airline operations. Just a few months ago, a 747 captain was stricken in flight and the remaining crew members assumed control of the airplane, according to established procedures, and continued the flight as scheduled. The passengers and the captain's wife who was on board never realized that the incident occurred."

In the two-pilot cockpit and fail-safe system is seriously degraded. The concept of workload reduction in these advanced airplanes is not meeting the expectations of the manufacturers, and, therefore the incapacitation of one pilot may make the task of safe aircraft operation a virtual impossibility.

Mr. Chairman, and members of the Committee, ALPA appreciates the inclusion of this statement in to the official Hearing Record. Thank you.

CONROE, TX, *October 11, 1985.*

EDWARD R. ROYBAL,
Chairman, House of Representatives, Select Committee on Aging, Washington, DC.

DEAR MR. ROYBAL: I am unable to attend the hearing on the age 60 rule for airline pilots. I would like you to know not all ALPA pilots agree with the ALPA policy.

I believe the country is losing some fine, experienced pilots because of the Age 60 rule. It is also picking up the expense of supporting these able-bodied men who are put out of work.

The present system of physicals and similar checks that evaluate and monitor a man at fifty nine and one half will do the same job on a man at sixty and one half.

My age is fifty one. I have been flying on a commercial air line for twenty nine years. I am one of the few pilots flying today who was in the cockpit before the Age 60 rule was enacted. I have flown with pilots who were over sixty, they were good, they were safe, they were highly competent.

Please retire the Age 60 rule.

Sincerely,

CECIL J. DURANT.

THE NATIONAL COUNCIL ON THE AGING, INC.,
Washington, DC, February 5, 1985.

Mr. DONALD D. ENGEN,
Administrator, Federal Aviation Administration,
Washington, DC.

DEAR MR. ENGEN: The National Council on the Aging is writing to urge that the Federal Aviation Administration expeditiously review its current policies with respect to restricting commercial airline pilots 60 years of age or older from engaging in commercial operations. NCOA believes that this unreasonable and baseless discrimination should be purged from Federal policy and that healthy, skilled pilots should be given the opportunity to continue to fly beyond their 60th birthday.

We believe that the sole criteria governing whether or not a person should be permitted to perform a particular job should be that individual's ability to perform the job in question. Older pilots, due to their wealth of experience, should actually enhance air safety through the experience and sophisticated judgment which they have developed over decades of flying experience. Forcing commercial airline pilots to retire at age 60 represents a foolish, archaic practice which amounts to nothing less than outright arbitrary discrimination on the basis of age.

We recognize that safety is vitally important in any industry involving the traveling public. And we would not be urging the FAA to reexamine this issue if airline passengers were to be put at risk. Since the time of the Age-60 Rule's adoption to guard against decreases in skill and risk of incapacitation which were thought to be related to aging, sophisticated medical technology and proven screening processes such as risk evaluation have been developed to accurately assess the medical status of an individual pilot. We believe that the availability of these new, noninvasive medical procedures completely undercuts any rationale whatsoever for the Age-60 Rule. We would also note that the FAA and the commerical airlines themselves have already relied on the accuracy of much of this medical testing in evaluating, recertifying and monitoring numerous individual pilots under age 60 who have suffered disqualifying conditions.

With respect to incapacitation, we would also like to point out that the historical record of pilot incapacitations bears little relationship to age. Incapitations not only affect pilots of all ages but find their basis in a wide variety of causes. Given these facts, as well as the redundancy of cockpit personnel, restricting older pilots from flying when adequate medical testing can determine their fitness and risk of incapacitation is a cruel trick on the pilots and airline passengers alike; there is simply no basis in fact for perpetuating this discrimination and its attendant compromises to air safety based on false, hysterical stereotypes, suggestive of a Grade B 1950's film melodrama, that a commercial airliner is going to crash because an older pilot presents a grave risk of suffering a heart attack.

We believe that there can be no cogent argument advanced which supports retention of the Age-60 Rule in an era where the medical sciences have evolved to their present sophisticated state. Accordingly, we strongly support the abolition of the rule. While we believe that this regulatory change should be expedited, we believe that immediate action should be taken to allow airline pilots to establish individual health status and fitness to fly through available medical and functional testing which would qualify them for an exemption from the Age-60 Rule.

Sincerely,

CHARLES EDWARDS, *General Counsel.*

AGING EFFECTS AND THE PROFESSIONAL PILOT

(By Robert W. Elliott, Ph.D., ABPP, Manhattan Beach, CA)

INTRODUCTION

Considerable research regarding the psychological, neuropsychological, physical, and social aspects of aging has been generated during the last few decades. As a result of this research, real life decisions regarding social programs, retirement, and medical treatment has resulted. Society, in general, has become increasingly concerned about the status and rights of the older citizen, for one reason, because this population is becoming a larger segment of our society. Those people who are 65 years or older now represent over 11% of the current United States population. Early into the next century, the same population may represent 20% or more of the U.S. population (Storandt, 1983).

Birren and Schaie (1977) reviewed much of the literature and research in the field of aging. Their review strongly suggested that the aging process affected various physiological and cognitive functions, but at vastly different rates. While most experts agree with this statement, there is now wide disagreement regarding the extent and nature of the changes accompanying the aging process. The most heated debate on this subject took place between Baltes and Schaie (1974, 1976) and Horn and Donaldson (1976).

THE PROBLEM

The FAA issued Civil Air Regulation Amendments 40-22, 41-29, and 42-24 in 1959. These amendments addressed the issue of maximum age limitations for airline pilots. These documents noted that the number of active pilots over age 60 was increasing, they were flying increasingly more sophisticated aircraft which were carrying more passengers, and they were operating in and out of airports and airspace with higher density air traffic. Concern was expressed by the FAA about the ". . . sudden incapacitation of some of the older pilots in the course of flight." The FAA noted that any efforts to predict who would suffer sudden incapacitation were considered futile and not medically sound because ". . . evidence of the aging process are so varied in different individuals . . .' and, therefore, inaccurate in regard to any single individual (Gerathewohl, 1978, p. 2).

The Pilots Rights Association and the U.S. House of Representatives Select Committee on Aging have questioned whether mandatory retirement for airline pilots at 60 years is justified in light of current medical and psychological research findings and advancements. In a letter from Donald Engen, FAA administrator to Captain Jack Young, President, Pilots Rights Association, (March 11, 1985), Engen maintained that the age 60 rule was ". . . the best solution to a difficult problem."

ISSUES IN AGING RESEARCH

Research investigating charges in aging has been beset with a number of difficulties. Botwinick (1977) pointed out that aging research which produced data regarding intellectual decline as age was increased depended on the (1) age spectrum being investigated; (2) kinds of tests used; (3) the researchers definition of intelligence; (4) sampling techniques; and (5) research design limitations. Because these variables may bias the results of research, investigators such as Schair (1980) have recommended a conservative position and have suggested that "decline" data should be regarded with suspicion.

Early research efforts which dealt with aging changes were generally cross-sectional design studies. The researcher would administer tests to subjects of various ages and would compare the performances of the different age groups. Thus, researchers were led to believe that intelligence, for instance, increased up to early adulthood, reached a plateau and remained there for about 10 years, and began to decline after the age of 40 years (Baltes and Schaie, 1974).

Longitudinal studies have become available which raise serious questions about the validity of cross-sectional studies. In longitudinal research, which is another design method with which to study age changes, the researcher tests a single group of subjects over a period of time, often years, and investigates the performance changes of each person at a different age. The results of such studies have suggested that intelligence does not decline as a consequence of aging as quickly as had been assumed with cross-sectional design studies. Schaie and Strother (1968) investigated this issue by administering two intelligence tests to 500 subjects, ranging in age from 21 to 70 years. Seven years later, 301 of the subjects were retested with the same tests. A number of the subjects were tested a third time after seven years had passed. When the data was analyzed cross-sectionally, the conventional pattern of early, systematic decline was observed. When the results were analyzed longitudinally, the only statistically significant declines identified were those which were speed related. There was no significant age-related change in cognitive flexibility. Crystallized intelligence, as well as other measures, improved with age. Even those over 70 years old improved on a number of measures. The differences between scores were a result mainly of generational differences and not due to differences in chronological age. When deterioration has been evidenced in longitudinal studies, the deterioration has tended to have been evidenced very late in life and "smaller in magnitude than in cross-sectional studies" (MacInnes, et. al., 1985). Genuine ability differences are not generally apparent until well over the age of 60 years (Anatasi, 1982).

Another critical issue evident in many of the research findings on aging is the issue dealing with the great differences in the rate of aging among and between individuals (Gerathewohl, March, 1978). Thus, a research finding may not apply to a single individual (Gerathewohl, August, 1978). Individual differences within any one age level are greater than the average difference between age levels. Studies of aging, investigating individuals in their 70's, 80's, and 90's, indicate that intellectual functioning is more closely related to the subjects' health than chronological age (Anatasi, 1982).

Figure 1 illustrates the greater differences among a group of older people than among the young, on a measure of cognitive functioning. In addition, the data indicate that 33% of those in their 60's perform at a higher level than the average for the group in their 50's (Schonfield, 1974). This data provides further support for the contention that greater individual differences are evidenced in the older person. Some individuals, as they age, show decline in skills, others show no change, and a few others show improvement.

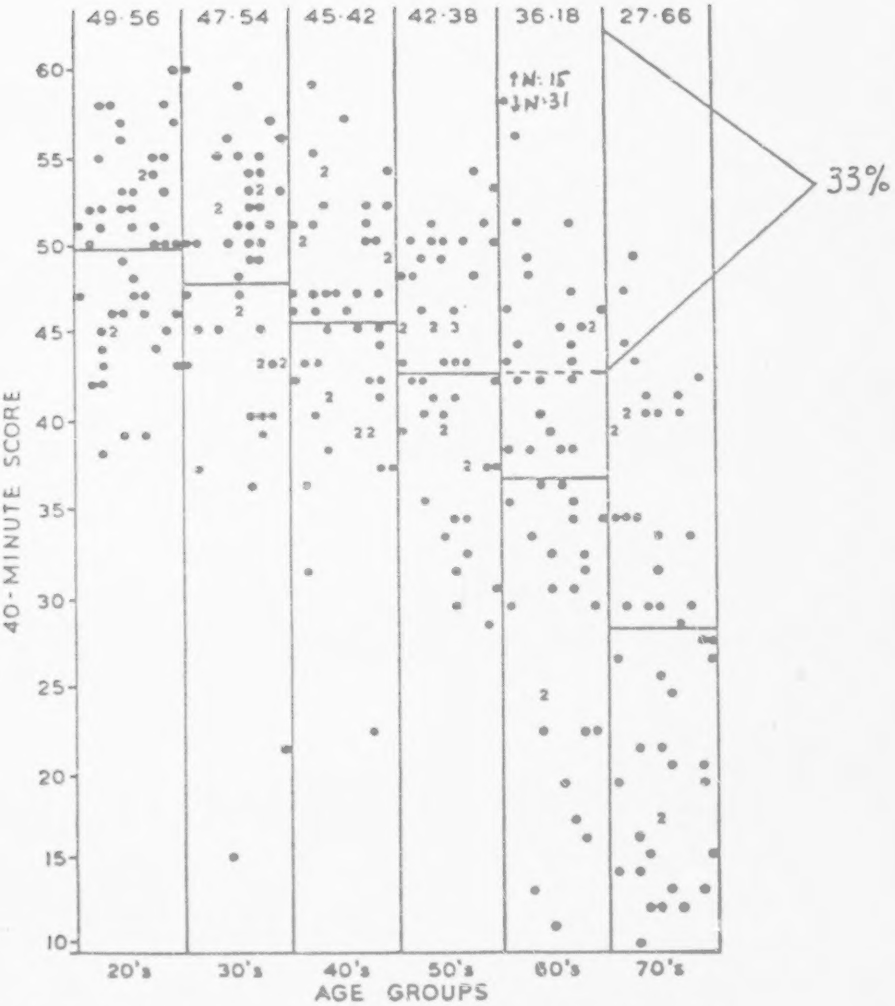


Figure 1: Progressive matrices (men): Distribution of 40-minute scores with means indicated by horizontal lines. (From *Age and Function* by A. Heron and S. Chown; London: J. & A. Churchill, 1967. Copyright 1967 by J. & A. Churchill.

CHANGES IN NORMAL AGING

Birren (1974) pointed out that aging individuals can do most of the things that they did when they were younger but now they can't do them as quickly. Yet, as noted earlier, the range of individual differences is considerable.

Aging is not synonymous with disease. Normal aging refers to a time-related biological process which is not a result of disease, trauma, or stress (Robertson, Ichabo and Arenberg, 1985). A wide variety of studies have shown that there is no loss of capability in certain functions, such as reasoning and memory, as one ages normally. There does appear to be a decline in speed of learning, speed of processing new information, and reaction time. Again, it is the encroachment of disease processes which accounts for the incapacity attributed to aging. Szafran (1968) noted that ". . . insofar as skill proficiency can ever be evaluated outside the flying situation itself, the routine aspects of the professional pilots' skills are unlikely to be seriously affected by aging over the usual span of normal working life." Professional pilots appear to be able to compensate for subtle losses with a strong capacity to adapt readily to changing requirements and conditions and high motivation in planning efforts to maximize their performance.

Personality issues in aging have produced a wide variety of statements about how personality changes over the years. Yet, very few research studies which support the proposition that personality changes as one ages are longitudinal in design. Those studies which have used longitudinal design features (Siegel, 1979; Costa and McCrae, 1978; Doublas and Arenberg, 1978) have independently come to the conclusion that personality changes little or none with age. There appears to be considerable stability of character, assertiveness, and sociability. The well adjusted 30-year-old is likely to become a well-adjusted 65-year-old. If one sees changes in personality, these changes may be an early signal of some type of pathological process.

Occasionally, one comes across statements that as individuals age, they seem to be less capable of handling stress. McCrae and Costa (1985) reviewed the literature and found that older persons are not under any greater stress than younger persons and cope with the stresses of life in as efficient a manner as younger individuals. Confusion, memory defects, depression, when evidenced in the older individual, are generally signs of physical problems (Jarvik and Neshkes, 1985).

ASSESSMENT OF AGING FEATURES

Through psychological and neuropsychological assessment processes and testing, levels of psychopathology, personality strengths and weaknesses, cognitive functioning, sensory responsiveness, and social behaviors can be investigated and measured. A number of measures and assessment processes are suitable for the older adult, although the availability of normative data on older adults is skimpy. Norms for the older adult are important for the assessment process because it is necessary to know if a test finding deviates from the norm because of psychopathology or because of normal aging declines.

Lezek (1983) summarized the four areas of intellectual activity which researchers have indicated have been associated with old age.

(1) Although the memory capacity of the elderly differs little from that of younger adults, storage and retrieval problems become evident with advanced age.

(2) The elderly have more difficulty manipulating abstract and complex conceptualizations. The elderly differ little from their younger counterparts in handling meaningful and concrete data.

(3) Difficulty in adapting to new situations and changing mental set is evident in individuals as they move into "old age."

(4) There is a general behavioral slowing which affects psychomotor activity and specific memory functions. This is not evident in self-paced tasks.

The ideal way to measure any psychological or neuropsychological condition or state is to compare the present level of performance with an earlier measured level of performance. Although longitudinal performance measures are rarely possible in most investigative studies (Miller, 1980), such a design should be used in any instance where there is concern about identifying a deteriorating condition. If a longitudinal design is used, care must be taken to make sure that the measures used are highly reliable and not compromised because of a practice effect.

In a series of memos and letters between the FAA and the House Select Committee on Aging (Personal Communications, February 25, 1985; April 26, 1985; and August 26, 1985) and in federal regulations (14 CFR, Part 21, V47, No. 131 and 14 CFR, Part 121, V499, No. 72), the FAA made a number of statements concerning the aging process. The FAA's concerns focused on deterioration of functions with age, loss of ability to perform a highly skilled task rapidly, inability to perform in a complex and stressful environment, inability to apply judgment and reasoning in new situations, slowing in the ability to process and respond to information and altered speed, and deficits in attention, psychomotor performance, memory, and problem solving ability.

In the same series of memos/letters, the FAA noted that there were no performance tests available which could predict or preclude adverse effects in any individual case and there was no appraisal system which could identify pilots who would pose a hazard to safety. They also noted that there were no measures which could determine the effects of aging on performance. They added that numerous formal studies focusing on the issue of aging had been ". . . made over the years, all with similar results. . . ."

Gerathewohl (1977), for the FAA, reviewed the literature on aging and its relationship to flight safety. In the studies reviewed, a number of traits, factors, and skills were identified which were said to have been affected by the aging process. For organizational purposes, Table 1 lists the traits, factors, and skills, commented upon in Gerathewohl's review, under one of the three headings: sensory process, cognitive process, and personality traits.

TABLE 1.—AGE-RELATED VARIABLES ASSOCIATED WITH BEHAVIOR, PERFORMANCE, AND PROFICIENCY OF AIRCRAFT PILOTS

[Gerathewohl, 1977]

Sensory processes	Cognitive processes	Personality traits
Perception	Memory	Adaptabilaity
Auditory	Acquisition	Judgment
Tactile	Storage	Self-identity
Visual	Recognition	Motivation
Speed	Recall	Adjustment
Reaction time	Long time	Temperament
Perceptual	Short	Leadership
Dexterity	Information processing	Interpersonal relationship
Spatial orientation	Problem solving	Self-discipline
Reserve	Flexibility	Self-confidence
Manual skills	Attention	
	Orientation	Anxiety
	Foresight	Tension
	Vigilance	Depression
	Reasoning	Ange

CLINICAL TESTING OF AGING FEATURES

Hundreds of psychological and neuropsychological tests are available from publishers for professional use. New tests are constantly being introduced because of an increasing need for specific patient information. Substantive developments in the field of testing are always evolving. For instance, there is a growing emphasis on construct validation in personality testing and renorming of test data in an effort to match more closely specific populations. Standardized neuropsychological batteries and computerized self-administered tests are new developments in the field.

It is not the purpose of this paper to discuss reliability and validity issues nor issues regarding standardization or development of normative groups. Those issues are covered extensively in a variety of text books on testing (Anatasi, 1982). Appendix A lists various tests which can be used to investigate the variables listed in Table 1. Some of these tests have been normed on an older adult population and others have not. A listing of the test publisher or source of the test is also included.

In Table 2, each age-related variable is listed with the tests indicated that are capable of measuring strengths, weaknesses, or characteristics of that variable. The publisher of each test is listed in Appendix A.

Table 2

Tests capable of Assessing Variables associated with Aging

(See Appendix A for Publishers)

	Age-Related Variables																																					
	Personality Traits														Cognitive Processes														Sensory Processes									
															Memory														Perception									
Test Titles	Adaptability	Judgement	Self-Identity	Motivation	Adjustment	Temperament	Leadership	Interpersonal Relations	Self-Discipline	Self-Conference	Anxiety	Tension	Depression	Anger	Acquistion	Storage	Recognition	Recall	Long Term	Short Term	Information Processing	Problem Solving	Flexibility	Attention	Orientation	Foresight	Vigilance	Reasoning	Auditory	Tactile	Visual	Speed	Reaction Time	Perceptual	Dexterity	Spatial Orientation	Reserve	Manual Skills
Adjective Check List								●																														
Auditory Discrimination Test																													●									
Bender Visual-Gestalt Test																							●															
Benton Visual Retention Test																		●					●								●					●		
California Psychological Inventory	●						●	●	●	●																												
Category Test (Booklet form)																							●															
Clinical Analysis Questionnaire								●			●	●																										
Cognitive Diagnostic Battery																								●										●				
Comrey Personality Scales								●	●	●																												
Consequences																										●												
Depression Adjective Check List													●																									
Edwards Personal Preference Schedule								●																														
Embedded Figures Test																						●																
Eysenck Personality Questionnaire					●																																	
Facial Recognition																		●	●	●																		
Finger Localization																														●						●		
Finger Tapping Test																																			●			
FIRO-B								●																														
Goldman-Fistoe-Woodcock Test of Auditory Discrimination																				●									●									
Goldman-Fistoe-Woodcock Auditory Skills Test Battery					●	●		●																					●									
Guilford-Zimmerman Temperament Survey																																						
Grooved Pegboard																																			●			
Halstead-Reitan Neuropsychological Battery															●	●	●	●	●	●	●	●	●	●				●	●	●	●		●	●	●	●	●	●
Hogan Personality Inventory	●						●	●		●	●		●																									
Holtzman Inkblot Technique			●		●						●	●	●	●																								
Hooper Visual Organization Test																								●							●					●	●	
IPAT Anxiety Scale											●																											
IPAT Depression Scale											●																											
Iowa Screening Battery for Mental Decline																								●	●													
Jackson Personality Inventory							●	●		●				●																								
Judgement of Line Orientation																																				●		
Kendrick Battery for the Detection of Dementia in the Elderly																				●													●					
Knox Cubes																				●				●														

Table 2 (Continued)

Tests capable of Assessing

Variables associated with Aging

(See Appendix A for Publishers)

Test Titles	Age-Related Variables																																							
	Personality Traits														Cognitive Processes															Sensory Processes										
	Anger	Depression	Tension	Anxiety	Self-Conference	Self-Discipline	Interpersonal Relations	Leadership	Temperament	Adjustment	Motivation	Self-Identity	Judgement	Adaptability	Reasoning	Vigilance	Foresight	Orientation	Attention	Flexibility	Problem Solving	Information Processing	Short Term	Long Term	Recall	Recognition	Storage	Acquistion	Memory	Manual Skills	Reserve	Spatial Orientation	Dexterity	Perceptual	Reaction Time	Speed	Visual	Tactile	Auditory	Perception
Learning Efficiency Test																							●	●	●															
Letter Cancellation Test																●																								
Luria-Nebraska Neuropsychological Battery																	●		●	●	●	●	●	●	●	●	●	●				●	●	●			●	●	●	
Manson Evaluation		●		●			●																																	
Manual Speed and Accuracy Test																															●									
Memory-For-Designs Test				●											●				●				●		●		●					●					●			
Minnesota Multiphasic Personality Inventory	●	●	●	●	●		●			●																														
Motivation Analysis Test											●																													
Motor-Free Visual Perception Test																															●		●							
Motor Impersistence Test (Benton)																															●			●	●					
Multiple Affect Adjective Check List	●	●		●																																				
Myers-Briggs Type Indicator													●																											
Objective-Analytic (O-A) Anxiety Battery				●																																				
Perceptual Speed Test																●			●				●																	
Personal Orientation Inventory							●					●																												
Phoneme Discrimination (Benton)																																							●	
Porteus Maze Test																	●																							
Profile of Mood States	●	●		●																																				
Progressive Matrices (Raven)																	●				●																			
Purdue Pegboard																																	●							
Quick Neurological Screening Test																			●													●					●		●	
Reaction Time Apparatus																																			●					
Rey-Osterreith Complex Figure Test																			●				●		●							●		●			●			
Right-Left Orientation Test (Benton)																		●														●								
Rorschach Psychodiagnostics	●	●	●	●			●			●		●		●																										
Schaie-Thurstone Adult Mental Abilities Test-Form OA																					●											●								
Senior Apperception Techniques		●	●	●			●			●																														
Serial Digit Learning (Benton)																							●		●															
Sixteen Personality Factor Test					●	●	●			●																														
Spatial Orientation Memory Test																																●								
State-Trait Anxiety Inventory				●																																				
Steadiness Test																																	●							
Stromberg Dexterity Test																																	●							
Stroop Color & Word Test																				●		●																		
Symbol Digit Modalities Test																			●															●						

Table 2 (Continued)

Tests capable of Assessing Variables associated with Aging

(See Appendix A for Publishers)

Age-Related Variables	Test Titles										
	Tactile Form Perception Test (Benton)	Temperament and Values Inventory	Temporal Orientation (Benton)	Thermatic Apperception Test	Three-Dimensional Block Construction	Trail Making Test	Visual Form Discrimination Test (Benton)	Watson-Glaser Critical Thinking Appraisal	Wechsler Adult Intelligence Scale-Revised	Wechsler Memory Scale	Wisconsin Card Sorting Test
Sensory Processes											
Perception											
Auditory											
Tactile	●										
Visual					●		●		●		
Speed											
Reaction Time											
Perceptual									●		
Dexterity									●		
Spatial Orientation					●				●		
Reserve						●			●		
Manual Skills									●		
Cognitive Processes											
Memory											
Acquistion									●	●	
Storage									●	●	
Recognition									●	●	
Recall									●	●	
Long Term									●	●	
Short Term									●	●	
Information Processing									●		●
Problem Solving								●	●		●
Flexibility									●		
Attention						●			●		●
Orientation			●								
Foresight				●							
Vigilance											
Reasoning								●	●		●
Personality Traits											
Adaptability											
Judgement				●					●		
Self-Identity											
Motivation				●							
Adjustment											
Temperament		●									
Leadership		●									
Interpersonal Relations		●									
Self-Discipline											
Self-Conference											
Anxiety									●		
Tension											
Depression											
Anger											

This listing of tests is not meant to be inclusive but represents a sampling of various measures available to the practitioner. Most of the tests listed are well-known to psychological testing specialists and all are readily available.

CONCLUDING COMMENTS

Research does indicate that there are declines in specific skills and functions as a result of the aging process. Some of the declines begin in the 20's and others begin in the 80's. It cannot be assumed that decline is apparent across all skill areas, nor does every individual manifest decline, nor is decline necessary as a result of aging. Many, if not most, skills are more dependent upon the individual's health status than upon his or her chronological age. Some research has even concluded that some skills improve with age. Cognitive tasks, in particular, appear to be fairly stable across groups, until about the age of 70 years. Benton el. al (1981) indicated that the ". . . intellectual status of healthy older people, as measured by neuropsychological tests, remained within normal limits through the eighth decade." When emotional declines have been associated with increasing age, these declines have frequently been associated with biological disturbances and physical complaints. New psychological disorders, with a physical component in the aged, are rare. Chronological age alone tells us very little about the status of an individual's function skills.

At times, the slower response rate seen in older people may also have some advantages. A number of studies (Birkhill & Schaie, 1975) concluded that older individuals tend to be more cautious and less likely to respond quickly in situations where they sense they will fail or in situations where the loss would be too high. Older adults prefer safer alternatives and are low risk takers.

The research on aging indicates that there are vast individual differences and individual patterns of changes as one ages. Psychological and neuropsychological assessment techniques have been developed which can address these differences and patterns. Early signs of deteriorating processes can be identified with a high degree of certainty and changes over time can be measured reliably. Current instrumentation is able to measure changes on age-related sensory, cognitive, and personality variables across a wide age span, including the over age 60 group. If a comprehensive evaluation is completed on an individual who has impaired skills, significant signs of impairment are likely to be evidenced. Until a decline in capability is evidenced, there is no valid reason, psychologically or neuropsychologically, why an individual should not be able to continue to function in his chosen profession—including professional pilots.

Research findings from the last decade argue that chronological years alone are not necessarily equated with decline and, therefore, age alone should not be considered a sufficient reason for retirement.

RECOMMENDATIONS

As individuals age, they are more susceptible to a variety of illnesses and are increasingly likely to develop disorders and experience difficulties in living. The risk of impairment increases for a group as they age. The FAA has available to them records on commercial pilots under 60 but few records on commercial pilots over 60 years. In order to compile data on the over 60 year old pilot, it is recommended that the maximum age for a commercial pilot be extended to 65 years before the pilot is manditorally retired.

After the age of 60 years, assessment of sensory and cognitive processes should be required as part of the pilots' six month routine medical evaluation. Competent examiners could be identified to complete this examination process. There does not appear to be sufficient evidence in existing research findings to justify the need for an assessment of personality and emotional variables.

APPENDIX

This appendix lists tests that can be used in the assessment of the age-related variables noted in Table 1. Some of the tests are batteries and contain a number of separate tests, each used for investigation of a specific area of functioning. The list is compiled alphabetically.

Ref. No.	Test titles	Publishers
1.	Adjective Check List	National Computer Systems.
2.	Auditory Discrimination Test	Western Psychological Services.
3.	Bender Visual-Gestalt Test	American Orthro. Association.
4.	Benton Visual Retenton Test	Psychological Corporation.
5.	California Psychological Inventory	Consulting Psychologists Press.
6.	Category Test (Booklet form)	Psychological Assmt Resources.
7.	Clinical Analysis Questionnaire	Instit for Pers & Ability Test.
8.	Cognitive Diagnostic Battery	Psychological Assmt Resources.
9.	Comrey Personality Scales	Educ & Industrial Testing Svc.
10.	Consequences	Sheridan Psychological Svcs.
11.	Depression Adjective Check List	Educ & Industrial Testing Svc.
12.	Edwards Personal Preference Schedule	Psychological Corporation.
13.	Embedded Figures Test	Consulting Psychologists Press.
14.	Eysenck Personality Questionnaire	Educ & Industrial Testing Svc.
15.	Facial Recognition	Oxford University Press.
16.	Finger Localization	Oxford University Press.
17.	Finger Tapping Test	Reitan Neuropsychology Lab.
18.	FIRO-B	Consulting Psychologists Press.
19.	Goldman-Fistoe-Woodcock Test of Auditory Discrimination	American Guidance Service.
20.	Goldman-Fistone-Woodcock Auditory Skills Test Battery	American Guidance Service.
21.	Guilford-Zimmerman Temperament Survey	Sheridan Psychological Svcs.
22.	Grooved Pegboard	Lafayette Instrument.
23.	Halstead-Reitan Neuropsychological Battery	Reitan Neuropsychology Lab.
24.	Hogan Personality Inventory	National Computer Systems.
25.	Holtzman Inkblot Technique	Psychological Corporation
26.	Hooper Visual Organization Test	Western Psychological Services.
27.	TPAT Anxiety Scale	Instit for Pers & Ability Test.
28.	IPAT Depression Scale	Psychological Assmt Resources.
29.	Iowa Screening Battery for Mental Decline	University of Iowa.
30.	Jackson Personality Inventory	Psychological Corporation.
31.	Judgement of LIne Orientation	Oxford University Press.
32.	Kendrick Battery for the Detection of Dementia in the Elderly	Psychological Corporation.
33.	Knox Cubes	Stoelting.
34.	Learning Efficiency Test	Psychological Assmt Resources.
35.	Letter Cancellation Test	Diller.
36.	Luria-Nebraska Neuropsychological Battery	Western Psychological Services.
37.	Manson Evaluation	Western Psychological Services.
38.	Manual Speed and Accuracy Test	Western Psychological Services.
39.	Memory-For-Designs Test	Psychological Test Specialists.
40.	Minnesota Multiphasic Personality Inventory	National Computer Systems.
41.	Motivation Analysis Test	Instit for Pers & Ability Test.
42.	Motor-Free Visual Perception Test	Psychological Corporation.
43.	Motor Impersistence Test (Benton)	Oxford University Press.
44.	Multiple Affect Adjective Check List	Educ & Industrial Testing Svc.
45.	Myers-Briggs Type Indicator	National Computer Systems.
46.	Objective-Analystic (O-A) Anxiety Battery	Instit for Pers & Ability Test.
47.	Perceptual Speed Test	Moran & Mefferd.
48.	Personal Oreintation Inventory	Educ & Industrial Testing Svc.
49.	Phoneme Discrimination (Benton)	Oxford University Press.
50.	Porteus Maze Test	Psychological Corporation.
51.	Profile of Modd States	Educ & Industrial Testing Svc.
52.	Progressive Matrices (Raven)	Psychological Corporation.
53.	Purdue Pegboard	Science Research Associates.
54.	Quick Neurological Screening Test	Jastak.
55.	Reaction Time Apparatus	Lafayette Instrument Co.
56.	Rey-Osterreith Complex Figure Test	Lezak.
57.	Right-Left Orientation Test (Benton)	Oxford University Press.
58.	Rorschach Psychodiagnostics	Grund & Stratton.
59.	Schaie-Thurstone Adult Mental Abilities Test-Form OA	Consulting Psychologists Press.
60.	Senior Apperception Techniques	C.P.S.
61.	Serial Digit Learning (Benton)	Oxford University Press.
62.	Sixteen Personality Factor Test	Instit for Pers & Ability Test.
63.	Spatial Orientation Memory Test	Language Research Associates.

Ref. No.	Test titles	Publishers
64.	State-Trait Anxiety Inventory	Consulting Psychologists Press.
65.	Steadiness Test	Lafayette Instrument Co.
66.	Stromberg Dexterity Test	Psychological Corporation.
67.	Stroop Color & Word Test	Psychological Assmt Resources.
68.	Symbol Digit Modalities Test	Western Psychological Services.
69.	Tactile Form Perception Test (Benton)	Oxford University Press.
70.	Temperament and Values Inventory	National Computer Systems.
71.	Temporal Orientation (Benton)	Oxford University Press.
72.	Thermatic Apperception Test	Harvard University Press.
73.	Three-Dimensional Block Construction	Oxford University Press.
74.	Trail Making Test	Reitan Neuropsychology Lab.
75.	Visual Form Discrimination Test (Benton)	Oxford University Press.
76.	Watson-Glaser Critical Thinking Appraisal	Psychological Corporation.
77.	Wechsler Audlt Intelligence Scale-Revised	Psychological Corporation.
78.	Wechsler Memory Scale	Psychological Corporation.
79.	Wisconsin Card Sorting Test	Psychological Assmt Resources.

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JONESBORO, GA, *October 24, 1985.*

Rep. EDWARD ROYBAL (D-Calif.)
Rayburn HOB
Washington, DC 20515

DEAR REP. ROYBAL, Thank you for your interest and concern for the professional airline pilot. The age sixty retirement is almost like a death sentence to many pilots who love their jobs more than anything else in their lives. As the wife of an airline pilot who faces this in three years, I can tell you, we both dread that day. He is the son of Georgia's pioneer aviator, has been flying since he was sixteen and flying is his life.

I have watched many people, in all walks of life, come to retirement. It seems when they give up their work, they often begin to age more quickly and their health goes. Their energy and purpose for living seems gone. As people are living so much longer, sixty seems too young to cut them off from their professions. Think of all the experience we lose by this.

The pilots have physicals every six months and flight checks regularly. I believe, if the records were checked (before this rule went into effect), they would find no more incidence of incapacitation in pilots over sixty than under sixty. However, I am sure that passengers are in more danger from hijackers and terrorists than from pilots over sixty.

There is one more thing the government must address concerning this mandatory retirement. It seems that one hand does not know what the other is doing. The FAA forces the pilot to retire at sixty and the Social Security punishes him for doing so by reducing his benefits. Now he has paid one of the highest premiums all his working life but receives reduced benefits. At the very least, he should be allowed to work until sixty-five or have some special rule concerning his Social Security benefits.

Thank you, again, for your concern and please keep up the fight. I am sending a copy of this letter to my congressman Rep. Newt Gingrich.

Sincerely,

MRS. DEE EPPS.

Congress of the United States,
House of Representatives,
Washington, DC, June 25, 1985.

Mr. Herbert Ewald,
Lighthouse Point, FL.

Dear Mr. Ewald: Enclosed please find the response I have received from the Federal Aviation Administration as a result of my inquiry on your behalf.

I apologize for the delay and hope this information is beneficial at this time.

If you have further questions pertaining to this correspondence or if additional discrepancies arise, please do not hesitate to call my office.

Sincerely,

E. Clay Shaw, Jr.,
Member of Congress.

Enclosure.

U.S. Department of Transportation,
Federal Aviation Administration,
Washington, DC, May 21, 1985.

Hon. E. Clay Shaw, Jr.,
House of Representatives,
Washington, DC.

Dear Mr. Shaw: This is in response to your April 25, 1985, letter concerning Part 121.383(c) of the Federal Aviation Regulations (FAR). Part 121.383(c) provides that a holder of a certificate under Part 121 of the FAR may not use persons 60 years of age or older as pilots, and that persons 60 years of age or older may not serve as pilots for certificate holders. In this sense, Part 121.383(c) is an operational, rather than a medical, rule because its restricts the operations of certificate holders and pilots employed by them.

Of course, the rationale for Part 121.383(c) is a basically a medical one. Pilots, like all of us, decline in physiological performance with age and are subject to an increased risk of cardiovascular and other diseases with potentially disabling consequences. From the operational perspective, as a natural part of the aging process, various skills and mental processes begin to deteriorate, often in subtle ways that are difficult to detect, yet which may pose a risk to air safety. Since it is not currently possible, given the available technology, to determine a person's physiological age, the FAA has concluded that chronological age is the only feasible way to determine when pilots should no longer be able to serve in Part 121 operations. For the same reasons, the FAA current practice is to deny exemptions from the provisions of Part 121.383(c).

I should point out that Part 121.383(c) does not "ground" a pilot on his 60th birthday. A pilot may continue to be employed by a carrier in operations other than under Part 121, such as a check pilot or flight instructor. He may also serve in a non-pilot position, such as a flight engineer or navigator.

I hope this information will help you in responding to your constituent's inquiry.

Sincerely,

Edward P. Taberman,
E. Tazewell Ellett,
Chief Counsel.

Air Transport Association of America,
Washington, DC, October 16, 1985.

Hon. Edward Roybal,
Chairman, Select Committee on Aging,
House of Representatives, Washington, DC.

Dear Mr. Chairman: The Air Transport Association of America (ATA) which represents the scheduled airlines of the United States[1] appreciates this opportunity to comment once again on the mandatory retirement age for pilots, the Age 60 Rule. For your record, I would like to reiterate the comments which we made on the National Institute of Aging's Report titled "Airline Pilot Age, Health and Performance: Scientific and Medical Considerations" in May 1981.

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[1] Of the 32 ATA member airlines, Frontier Airlines and Republic Airlines have differing views on the mandatory retirement of pilots at age 60.

The basic issue raised by any consideration of a mandatory retirement age for airline pilots is safety; it is not an issue of discrimination, economics, or pension plans, but safety. The Report confirmed that:

(1) Pilot performance can be adversely affected both by decrements accompanying the aging process and by a broad variety of medical conditions, the incidence of which increases with age.

(2) Despite the various advances which the Report advocates be considered with a view towards improving the medical certification process, validated medical and pilot performance tests to measure certain age-related performance decrements and the effects of such decrements on pilot proficiency are lacking.

ATA thus views the Report as providing solid additional support for its position that safety should in no way be compromised by a change in the mandatory retirement of pilots at age 60.

Sincerely,

J. Roger Fleming,
Senior Vice President, Technical Services.

Manhasset, NY, *October 13, 1985.*

Cong. Edward R. Roybal,
Chairman, Select Committee on Aging,
House of Representatives, Washington, DC.

Dear Congressman Roybal: I understand that you are conducting a hearing into the FAA's Age 60 Rule for commercial airline pilots on October 17, 1985. Unfortunately, I will be working that day and cannot attend but wish to make a statement for the record.

I have just returned to work as a Flight Engineer as a result of court action and have also just had my sixty-seventh birthday. I had been away from flying for seven years, yet had no difficulty qualifying as a Flight Engineer on the L-1011. Previous to my forced retirement I had been a captain for twenty-five years, the last few on the L-1011. As part of my Flight Engineer training I "flew" the flight simulator as captain for about two hours. The check captain on this "flight" said that I flew as well as most trainee captains flew after about twenty years.

In being put back to work under a court order I was subjected to a much more comprehensive physical examination than is normally inflicted on pilots. I also took a lengthy psychological examination and a treadmill stress test.

The worn out statements made by the FAA that they cannot test persons over the age of sixty is absolutely false. A test is valid at any age.

The FAA tries to say that the Age 60 Rule has resulted in the present safety record of the airlines and should therefore be kept. Actually the safety record has not changed much in the last forty years. Consider these facts.

(1) Prior to 1960 there were quite a few captains flying who were over sixty and none were involved in a recorded accident.

(2) All accidents of airline aircraft have been by captains that have been less than sixty years of age.

(3) There are records that show that a great many pilots have been incapacitated or even died in flight.

(4) All of these incapacitations were of pilots less than sixty years of age. Most of them being caused by "food poisoning."

(5) No scheduled airline accident in the United States by a U.S. company has ever been found to have been caused by the physical or mental condition of a flight deck crew member.

(5) The forced retirement of competent pilots simply because of age has resulted in the rapid promotion to captain of inexperienced persons and has resulted in at least one serious accident. (The Air Florida crash at Washington National Airport just a couple of years ago.)

At the present time there is a great shortage of qualified pilots in this country and this situation is being greatly aggravated by the forced retirement of qualified pilots.

Sincerely,

Eugene W. Garges, Jr.

RISK-BASED VERSUS AGE-BASED CERTIFICATION OF AIRLINE PILOTS

(Statement prepared for the House Select Committee on Aging by Axel A. Goetz, M.D., Ph.D., Vice President, Research, General Health, Inc.)

The Federal Aviation Administration's congressional mandate is to ensure that the U.S. airlines "perform their services with the highest possible degree of safety." How well is this mandate served by the FAA's present rule requiring commercial airline pilots to retire at age 60? Can it be served better by adopting another retirement rule?

Threats to public safety arise to the extent that pilots are not proficient or are at risk of sudden adverse health events (e.g., stroke). The fact that proficiency deteriorates and risk increases with age is the basis for the Age 60 Rule. Age is a good predictor of average risk and average proficiency in the population of airline pilots. However, by itself it is a poor measure of risk and proficiency of individual pilots because it is indirect and its influence is often small compared to the combined effect of other variables. To minimize erroneous decisions about certification of individual pilots one has to measure risk and proficiency as directly as possible. While direct measurement techniques for proficiency are employed extensively, the same cannot be said for risk.

The following discussion deals with the measurement of individual risk. It shows for a specific case that age, by itself, is a poor measure of risk. At any age, the individuals in a population show a wide range of risk of, say, getting a heart attack. The variability of risk within age groups far exceeds the variability of risk among age groups. This implies that there are hgh risk individuals at low ages and low risk individuals at high ages. To the extent that present procedures do not detect high risk pilots below age 60 (even though detection is quite possible), they conflict with the FAA's safety mandate. To the extent that present procedures exclude proficient low risk pilots due to age, they are unnecessarily stringent. Considerable improvements are feasible in measuring risk of the most important source of catastrophic health events, namely cardio-vascular disease. Such improvements would contribute to airline safety, and they would permit relaxation of the Age 60 Rule without compromising safety.

Judicious application of risk estimation methods would permit healthy and proficient pilots to continue flying under Class I certification past the present age limit. Younger pilots at high risk could be recertified, provided they effectively reduced their risks through appropriate therapeutic and health promotion interventions.

The present retirement rule limits risk of cardio-vascular catastrophic events only partially, as age is only one among many contributors to risk. Table 1 shows a selection of contributors to risk as used in a commercial instrument to appraise risk of heart attack and stroke.

The combined influence on risk of other contributors is so large that it can be more important than the influence of age on risk of catastrophic events. Figure 1 and Table 2 indicate that at any age there exists a distribution of risk around an average value, with a wide spread between high and low risk individuals.

The distribution of risk over age provides the opportunity to identify pilots at different levels of risk, and to use risk information in certification decisions. For example, because the present examination system does not require consideration of certain risk indicators (total serum cholesterol, high density lipoprotein (HDL), Type A behavior, exercise), a 50-year-old pilot may actually be at high risk of heart attack or stroke.

Currently, renewal of first-class certification may be based on a false belief that the pilot is at low risk simply because he or she is less than 60 years old. In reality, the pilot may be at high risk and certification should be withheld until the pilot reduces his or her risk to an acceptable level. On the other hand, a 60-year-old pilot may be at a lower risk level than, say, the average 40-year-old pilot. The 60-year-old may then be certified without restriction until such time that he or she reaches a pre-set level of acceptable risk, or until other factors require termination.

Risk-based versus age-based certification decisions are illustrated in Figures 2 and 3. The present, age-based decision excludes a number of low-risk pilots at ages 60 and above ("Error 2", Figure 2) while admitting to active status some pilots below age 60 but at high risk of heart attack or stroke ("Error 1"). A risk-based decision rule would exclude pilots above a pre-set level of risk, regardless of age (Figure 3).

At minimum, adoption of a risk-based certification approach would require examination of blood samples for serum lipid levels and blood sugar each time a risk appraisal is administered. Possibly measurement of fitness level, Type A behavior tendencies, and cigarette smoking would also be required.

Where indicated, low-cost general risk appraisals can be complemented by more expensive or more invasive techniques to refine risk estimates further. Such staged, or branching risk work-ups would be desirable in cases when initial risk results are borderline. More extensive work-ups could be made mandatory in an age dependent fashion.

Risk levels cut-offs for Class I certification would have to be established with great care, especially at first when norms specific to the population of airline pilots are not yet available. Initially, the cut-off point could be indexed to risk in the average U.S. population (e.g., the 60th percentile of risk of heart attack or stroke). The precise level for cut-off obviously is not a scientific issue. It would be feasible, although not necessary rational, to have different risk cut-offs for different age ranges, e.g., a more stringent cut-off at the 40th percentitle of risk in the average population for pilots above, say, age 65. In any case, due to the rapid increase of risk with age, the proportion of certifiable pilots would rapidly decrease with age.

SCIENTIFIC BASIS FOR CARDIO-VASCULAR RISK APPRAISAL

Health risk appraisal is a method and a tool that describes a person's chances of becoming ill or dying from selected diseases, for example, the chance of a 65-year old male pilot's suffering a stroke. The procedure generates a statement of probability, not a diagnosis. To appraise a person's risks it is necessary to identify his or her risk relevant characteristics, for example, blood pressure or smoking habits. Data on these characteristics are entered into a risk model which compares individual data with those of groups of similar persons previously investigated in epidemiologic studies.

Three categories of data are needed for modeling risk: 1. Data associating individuals' characteristics with occurrence of disease and death, 2. Data on the occurrence of disease and death in the population in which risk is to be appraised, and 3. Data on the frequency of occurrence of risk relevant characteristics in the population in which risk is to be appraised. The latter two categories of data are taken from the U.S. Vital Statistics, the Census, and special statisitical surveys.

Data on associations between risk characteristics and occurrence of cardio-vascular disease and death are derived from studies of large groups of persons whose characteristics are evaluated repeatedly over many years. Statistical analyses then describe how those individuals who developed cardio-vascular disease differ in their characteristics from those who did not. This description has the form of a set of equations which best fit the study observations. Once a satisfactory model has been developed to describe the observed data, the same equations can then be used to estimate risk of cardio-vascular disease for persons or groups who are members of the original study population (Gordon, 1974). The numerical examples contained in this statement are generated in this way based on risk models from the Framingham Heart Study, one of the most important studies of its kind (Kannel and Gordon, 1968–1978).

If any decisions about people are to be based on risk estimates, the estimates must be dependable. Since risk models are derived from one group of individuals and then applied to others it is important to know if the models work outside the original study. This is indeed the case (Pooling Project, 1978). It is also important to know if the model estimates agree with clinical findings, e.g., such that one would find more obstruction of coronary arteries in X-ray studies in patients for whom an independent risk appraisal estimated higher heart attack risk. This too is the case (Pearson, 1984). Originally, data on risk in older individuals were sparse, however, the aging of populations in many cohort studies has recently permitted the generation of useful results for groups over age 60.

Among all diseases, risk appraisal for cardio-vascular disease appears to be the most firmly grounded in epidemiologic research. An an adjunct to periodic medical examinations and flight proficiency tests, risk appraisal can contritute to safety, to the health of pilots, and to more flexible rules for retirement of airline pilots.

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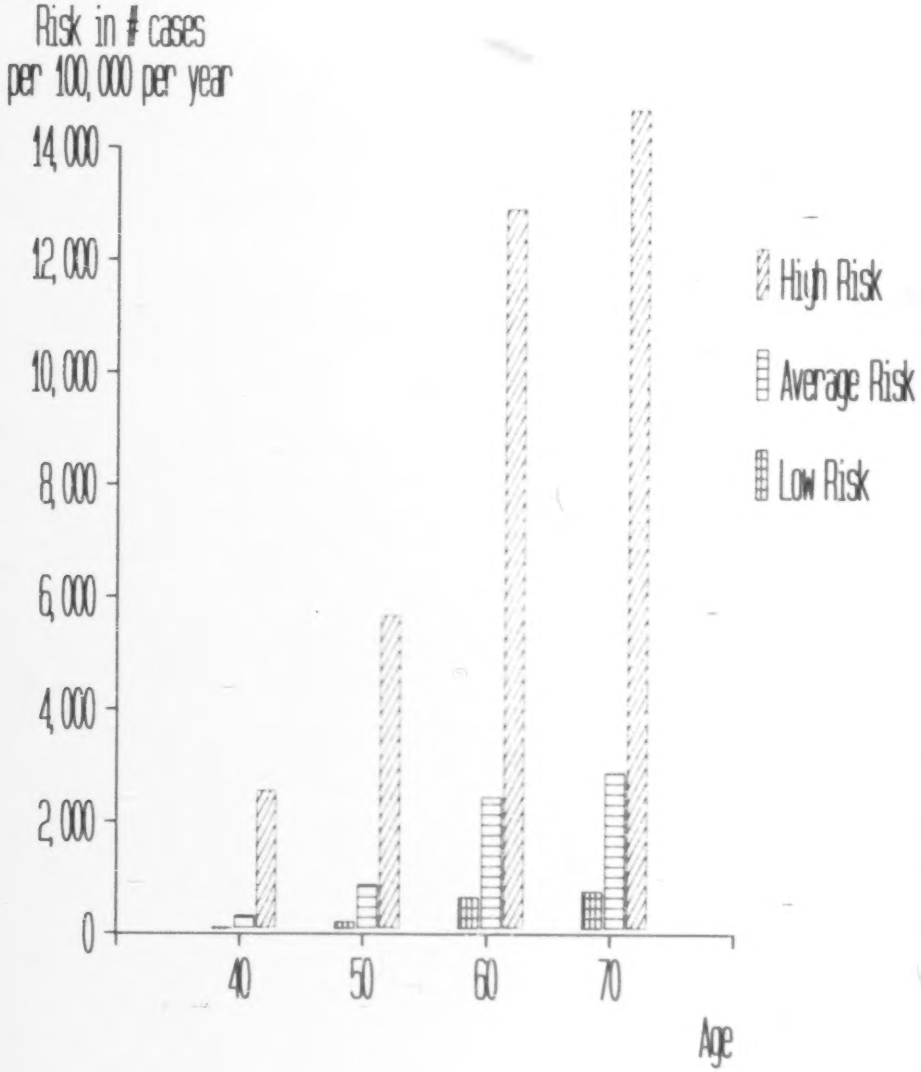
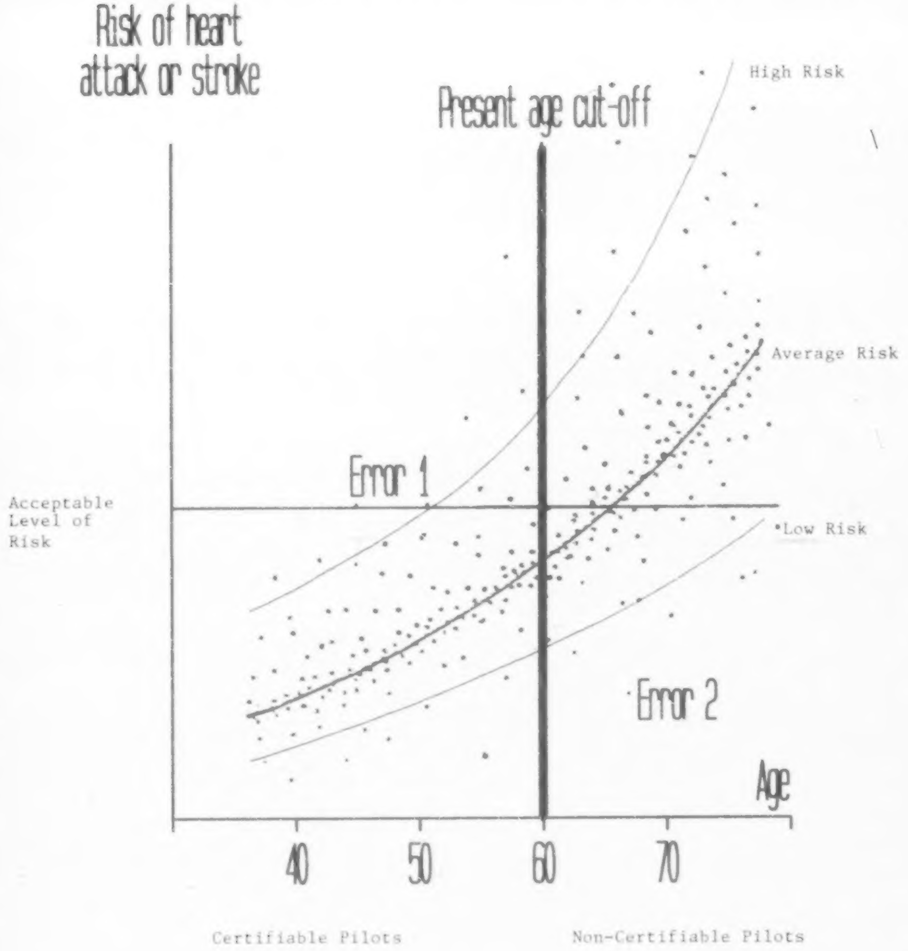


Figure 1 : Risk of Heart Attack or Stroke

GENERAL
HEALTH

Figure 2 : Age-Based Certification Decision



Error 1 : Inclusion of high risk pilots
Error 2 : Exclusion of low risk pilots

Figure 3 : Risk-Based Certification Decision

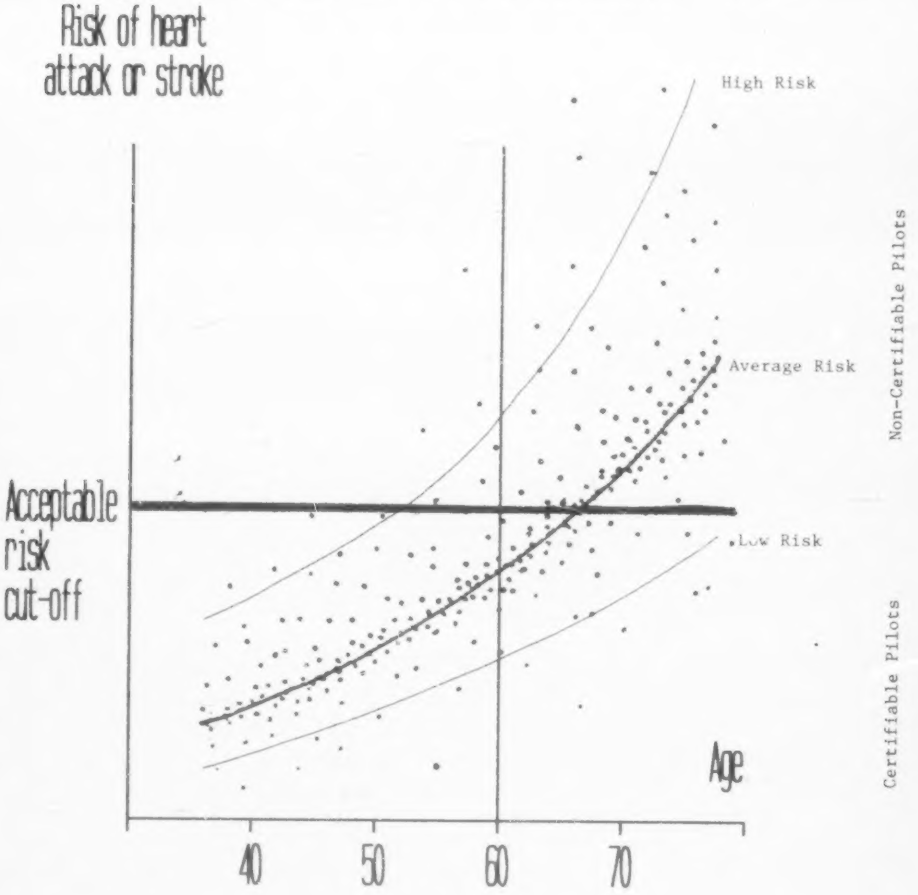


TABLE 1.—RISK INDICATORS FOR CORONARY HEART DISEASE

Age
Age * Age
Sex
Cigarette smoking
Systolic blood pressure
Total serum cholesterol
Age * total serum cholesterol
High density Lipoprotein
Glucose intolerance
Lef ventricular hypertrophy
Type A behavior
Exercise
Use of oral contraceptives

TABLE 2.—RISK OF HEART ATTACK OR STROKE AS SHOWN IN FIGURE 1

[In expected numbers of cases per 100,000 population per year]

Age	Risk level		
	Low	Average	High
40	119	334	2,656
50	295	902	5,741
60	721	2,465	12,975
70	856	2,958	14,773

RISK INDICATOR LEVELS USED FOR TABLE 2 AND FIGURE 1

	Risk level	
	High	Low
Cigarette smoking (cigarettes/day)	20-39	0
Systolic blood pressure (mmHg)	160	120
Total serum cholesterol (mg/dl) [1]	Average	Average
High density lipoprotein (mg/dl)	40	60
Glucose intolerance	Yes	No
Left ventricular hypertrophy	No	No
Type A behavior [2]	High	Moderate
Exercise kcal/week [2]	500	2,000

[1] The association of total serum cholesterol with risk declines with age. Therefore, age-specific cholesterol levels were assumed.
[2] Not included as risk indicator for stroke.

AARP,
Washington, DC, January 29, 1985.

Hon. Edward Roybal,
Chairman, Select Committee on Aging,
House of Representatives, Washington, DC.

Dear Congressman Roybal: We are pleased to have this opportunity to voice our support for your efforts on behalf of older pilots.

At present, the FAA's Age-60 rule prohibits persons 60 and over from piloting commercial aircraft. This policy originated in 1959 and was promulgated for public safety concerns. It was then accepted that medical expertise could not adequately distinguish between older pilots who posed a safety risk and those that did not.

A review of the medical data supporting the rule was made in 1982 by the National Institute of Health. Their report found no medical evidence to support the forced retirement of all older pilots, but recommended retaining the rule until procedures to change it could be implemented. Such procedures have yet to be initiated.

One way to relax the Age-60 rule is through the development of an exemption procedure. The FAA has the statutory authority to grant exemptions to the rule under 49 U.S.C. Section 1421(c). To date, no exemptions have been granted, nor has an exemption procedure been introduced. The time has come for the FAA to consider a change in policy.

We believe that at the very least an exemption procedure could be developed which would protect the rights of older pilots while satisfying public safety concerns. Experts in medicine and aging are ready to meet with the FAA to discuss the development and implementation of such a procedure.

We urge the FAA to consider implementing an exemption procedure. We are confident given the expertise of those involved that a medical protocol can be established that would satisfy legitimate safety concerns and allow competent older pilots to remain active.

AARP believes it is the right of all individuals, if capable to choose to continue working. Age limits, which artificially categorizes on the basis of age alone, fail to recognize an individual's ability. Such arbitrary barriers to employment should not prevent continued job opportunity for otherwise skilled older workers.

Thank you for your consideration in this matter.

Sincerely,

PETER W. HUGHES,
Legislative Counsel.

MERCER ISLAND, WA, *October 13, 1985.*

Hon. EDWARD R. ROYBAL,
Chairman, Select Committee on Aging,
House of Representatives, Washington, DC.

DEAR CHAIRMAN ROYBAL: I have been advised of your October 17 scheduled hearing into the FAA's Age 60 Rule and hope to be able to attend. I filed for an exemption to this rule in 1977, supported by a complete medical presentation, but the court at that time found in favor of the FAA—not on the basis of the evidence, but because of the FAA's right to make rules.

I am enclosing copies of letters to President Reagan and Senator Daniel J. Evans of Washington. Your interest and support in this matter is sincerely appreciated.

Cordially,

MAURY KEATING.

MERCER ISLAND, WA, *October 13, 1985.*

President RONALD REAGAN,
The White House,
Washington, DC.

DEAR PRESIDENT REAGAN: First, I would like you to know how pleased and proud we are for our country's prompt and effective action against the latest hijacking. Congratulations.

I am aware of how you feel about forced retirement because of age, as I have corresponded with your office several times during the past five years. I have been advised that the U.S. House of Representatives Select Committee on Aging is holding hearings October 17 on the FAA's Age 60 Rule. I have written Senators Evans and Gorton and Representative Chandler and have enclosed a copy of the letter I wrote to Senator Evans. All of us that have been affected by mandatory retirement based only on date of birth will sincerely appreciate the support your office can provide in our efforts to eliminate this discriminatory rule.

Also, I can assure you and Mrs. Reagan that your minor skin operations should be of no concern. I have had quite a few removed in the last ten years—no problems.

Sincerely,

MAURY KEATING.

MERCER ISLAND, WA, *October 10, 1985.*

Hon. DANIEL J. EVANS,
Hart Building, Room 702
Washington, DC.

DEAR SENATOR EVANS: I think the last time we met was during your campaign when we took a quick trip around the State in our King Air.

I have enclosed a copy of a letter from the Hon. Edward R. Roybal, Chairman of the House Select Committee on Aging regarding the October 17 hearing on the FAA's Age 60 Rule.

This rule continues to force retirement on healthy, capable pilots and your support of legislation that will eliminate this discriminatory 1958 rule will be sincerely appreciated. I feel confident that President Reagan and the latest opinion of our top medical people agree that forced retirement at age 60 from any profession is neither desirable or necessary when operational capability and physical condition can be monitored and evaluated.

I am now flying for Airlift Northwest, a rapid response medical group for the Seattle area hospitals, based at Boeing Field and operating three turboprops and one jet. On October 8 I flew our air ambulance turboprop to Pasco, Boeing, Wenatche, Yakima, Boeing, Juneau and Boeing—a total of 10 hours. I find I can still perform on long trips as well as most younger pilots, although I will have to admit that my last airline schedule from Honolulu to Vancouver, B.C. in a Multiple crew DC-10 in 1977 was somewhat less strenuous.

Thank you for your help.

Sincerely,

MAURY KEATING.

THE WHITE HOUSE,
Washington, December 17, 1982.

Mr. MAURICE KEATING, Jr.,
Mercer Island, WA.

DEAR MR. KEATING: Thank you for your recent letter regarding aged based retirement for pilots of multiple crew commercial aircraft. After reviewing your correspondence with the federal government, I apologize for the lack of attentive response. This issue is one of obvious importance to many Americans.

The Federal Aviation Administration has agreed to conduct a study of the implications of the inflexible "age 60" rule. Under the study, selected pilots will be able to fly multiple crew aircraft well past their 60th birthdays. These pilots will be under constant medical evaluation. Depending on the results of that study, the inflexible "Age 60" rule may well be significantly altered.

While many who bear the brunt of this restrictive regulation would prefer to see immediate action, I am sure you will agree that the study option is superior to inaction at the FAA.

Thank you again for writing to me regarding this issue of such importance to America's commercial pilots. The comments you have offered will assist the government in formulating a more rational federal policy.

Sincerely,

CRAIG L. FULLER,
*Assistant to the President
for Cabinet Affairs.*

[From Western Flyer, 1st Issue of December, 1983]

75-Year-Old Still Dusting Crops After 18,000 HOURS

(By Helen Allen)

Max Shears, 75, still enjoys skimming farmlands and citrus tree tops at 110 miles per hour with no thought of giving up his cockpit seat for an easy chair or a daily round of golf.

"I'm not old enough to retire," declared the tall, handsome Arizona crop duster who looks at least 10 years younger than his year. "Whenever there's any flying to do, I fly."

Actually, the low flying pilot can't imagine what life would be like without an airplane. "I've spent so many years in it," he says.

His wife, Louise, isn't pushing him to quit either.

"It's his life," she commented and then added with a laugh: "Besides, the only way I can get him to retire is to shoot him down.

Shears, believed to be the oldest working crop duster in Arizona, has chalked up; 18,000 hours flying time since 1937. His flying these days is in a bi-winged Grumman Ag-Cat, but he still has a vivid recollection of the day he soloed at Hanford, CA, and the first plane he owned.

"You never forget the day you solo," he remarkd. "It was May 13, 1937. And the plane was a E-2 Taylor Cub.

One of the reasons he probably never forgot the date is because it took the exCalifornian 10 years to raise enough money for flying lessons.

He bought his first plane after three hours of solo time, a two-winged Travel Air which didn't have brakes or a tail wheel.

"There was no way to stop or steer it," Shears recalled with a smile. "But I knew I was an aviator because I had my own plane." He took the plane through 140 hours of flying time and seven forced landings.

"The engine kept quitting on a regular basis," he quipped.

Shears, who lives in a rural area near Avondale, was an aircraft maintenance superintendent for a California flight service and had just gotten his commercial pilot's license when World War II broke out.

He continued the ground crew job after the firm was converted into a preliminary Air Corps flight school, but was anxious to get into the flying end of things.

An Air Corps flight instructor post opened up at Thunderbird Field near Phoenix and Shears grabbed it.

The job of training Air Corps pilots wasn't considered essential to the war effort, Shears said, and it was suggested that he and other civilians at the school join the Air Corps Reserve to avoid being drafted. The unit was sworn in and immediately put on inactive status.

Because of the inactive status the instructors never rose beyond the rank of private, but they trained nearly 2,000 Army Air Corps and Chinese Air Force pilots at Thunderbird Field.

After the war, Shears went to aircraft maintenance work, first at Sky Harbor Airport in Phoenix and later at his own air strip west of the city.

A lot of planes needed repairs at that time, he said, but the pilots never seemed to have enough money to pay for them.

"I decided crop-dusting would be more practical," he added.

The pilot ran his own crop-dusting service for about 20 years. Ten years ago he decided to give it up and go to work for McNeley Air Service Inc., an El Mirage firm now managed by his son, Beryl.

Three of his sons, including Beryl, have followed in their father's footsteps, first in taking to the air and later turning to cropdusting, which Shears claims is now a misnomer.

"There's been very little dusting the past 15 years," Shears said, adding it's now mainly liquid spraying.

His job also includes fertilizing citrus trees from the air.

Shears contends there's really little difference between flying a plane at 10,000 feet and two to four feet above the ground. What counts is the pilot's attitude, not altitude.

At 10,000 feet the only thing pilots need to look out for are other planes. But in skimming farmlands, they need to keep an eye out for power lines, tractors and anything that might be sticking up above the ground, Shears said.

Future plans include flying and dusting crops until he flunks the annual physical needed to keep his license.

WRIGHT STATE UNIVERSITY,
SCHOOL OF MEDICINE,
DEPARTMENT OF COMMUNITY MEDICINE,
Dayton, OH, October 1, 1985.

Hon. EDWARD R. ROYBAL,
Chairman, Select Committee on Aging,
House of Representatives, Washington, DC.

DEAR MR. ROYBAL: In reply to your letter of September 13, I am submitting the following comments for the record concerning your hearing on commercial airline pilots scheduled tentatively for October 17.

The FAA's "age 60" rule under FAR 121 that applies to the pilot and copilot of FAR 121 airline operations, is a relic from the vacuum tube, pre-computer era and is causing the premature loss of skilled, experienced, productive, healthy pilots from the airline workforce whose only "crime" is to have maintained good health through lifestyle and work habits that enable them to reach age 60 healthy and functioning.

If there is a question about a given pilot, the ability to reliably evaluate the physical condition of any pilot of any age can be accomplished by numerous tests available today, including:

FAA class I or II medical examination (depending on the pilot-in-command or copilot position of the individual candidate);
Family history (if applicable);
Past medical history;

Present medical history;

Physical examination to check for any additional items warranted by history;

Blood chemistry tests (for example "SMAC-24" or equivalent);

Complete urinalysis, if indicated;

Chest X-ray, if indicated;

Bruce protocol exercise cardiovascular stress test, if indicated;

Psychological testing, if indicated (Wechsler Adult Intelligence Scale, Wechsler Memory Scale, Perceptual Speed Cancellation Test, and others as might be indicated in individual cases).

The ability to evaluate the performance capability of a given pilot of any age can be reliably assesed according to specific criteria by the following:

(1) Demonstrated past history of flying competency.

(2) Demonstrated flight check competency as required under FAR 121.

(3) Demonstrated simulator check competency as required under FAR 121.

(4) Demonstrated enroute competence as required under FAR 121.

(5) Demonstrated skills in an advanced visual simulator approved by the FAA for type ratings of airline pilots such that the newly type-rated pilot can make his or her first flight in the airline aircraft with revenue passengers having never actually flown the aircraft before (FAR 61 Appendix A). This high fidelity "zero flight time" assessment and certification attests to the validity of modern aircraft simulators and can be accomplished using repeated high workloads and emergency procedures that would be very costly and time consuming in actual flight.

Reserve capacity in healthy older persons is repeatedly demonstrated in sports medicine studies, senior olympic games, marathons, and other activities (see the appended three papers).

The President of the United States, in his mid-70's, has demonstrated the remarkable reserve capacity in older healthy persons, including a rapid recovery from the near fatal chest wounds due to an attempted assasination and major abdominal surgery for cancer. This example of the remarkable mental and physical stamina representative of a man in the 70's, a man who carries the burden of Chief of State, flies in the face of those who claim enfeebleness for those pilots who have reached age 60.

In our modern era of coronary by-pass surgery, organ replacement, CAT, echo diagnostics, risk factor analysis, neurological, psychiatric and psychological assessments, plus fundamental medical and scientific progress that has occurred, it is time for the Federal Government to act to eliminate the now disgraceful and wholly unjustified age 60 rule.

The FAA should now get the "age 60 rule" relic off the books, a step that would retain skilled, experienced, safe pilots in productive activity, enhance the safety of the total pilot population through skill retention and exchange, and eliminate another odious prejudice from the Governments regulations.

Thank you for the opportunity to communicate concerning this vital human rights issue before the Congress and the Country.

Sincerely yours,

STANLEY R. MOHLER, M.D.
Professor and Vice Chairman,
Department of Community Medicine, Director, Aerospace Medicine.

Enclosures: Reasons for Eliminating the "Age 60" Regulation for Airline Pilots; Aircrew Physical Status and Career Longevity; Civil Pilot Taxonomy: Implications for Flight Safety.

Human Factors Bulletin

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CIVIL PILOT TAXONOMY: IMPLICATIONS FOR FLIGHT SAFETY

by

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Department of Community Medicine
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Dayton, Ohio 45401

INTRODUCTION

Information on the characteristics of pilots comprising the general aviation and airline populations is necessary in order to have in hand accurate demographic facts when questions of gender, age and other characteristics arise. This paper provides a current description of some taxonomical characteristics of civil airmen.

For comparison purposes it also displays relevant accident data as distributed by cohort segment, including flight-time correlations. Conclusions concerning relative risks between cohort segments can be readily drawn from data available from the U.S. Federal Aviation Administration (FAA), the U.S. National Transportation Safety Board (NTSB) and other sources.

ANCESTRY

The FAA pilot and medical certification procedures quite properly do not inquire into racial extraction or ethnic derivation. These are taxonomic areas that the authorities readily acknowledge have no bearing on air safety, because performance and physical status of a given individual pilot determine his or her safety record, not this taxonomic category.

The outstanding World War II accomplishments of black pilots put to rest questions raised by some in this area [10]. It also has been shown that sickle trait alone has no bearing on performance as a pilot. Neither the International Civil Aviation Organization (ICAO) nor the FAA considers this a safety hazard [4].

GENDER

Female pilots as a group appear in the fatal accident statistics in general aviation two thirds times less than their male counterparts in normalized data [5]. Present air safety analysts seem disinclined to pursue the superior safety record produced by the overall cohort of female pilots.

The above reference cites major reasons for the female pilot safety record as the lower representation of these pilots in alcohol-related accidents, in unwarranted low-level maneuver accidents and in accidents associated with the deliberate penetration of adverse weather. These accident categories comprise the three major killers of male general-aviation pilots.

HEIGHT AND WEIGHT

The FAA publishes annual figures on active pilot height and weight characteristics, all dimensions in the English system [1]. This data can be of interest to those who design aircraft cockpit areas, especially cockpit dimensions, seat sizes and restraint-system features.

As of Dec. 31, 1982, 1,270 male and 324 female pilots were less than 59 inches tall, and 18.247 male and 67 female pilots were over 76

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inches tall.

In regard to body-weight levels for the same period, 262 male and 70 female pilots were less than 90 pounds in weight, and 8,335 male and 70 female pilots were over 249 pounds.

FAA studies in the past have found excess accident rates in the cohorts of excessively tall or short pilots, as well as in excessively light or heavy pilots [3]. The association of excessive weight in relation to habitus, with the adverse health problems of hypertension, cardiovascular disease, stroke and other diseases has long been established. The studies also provide "ponderal index" computations in relation to accidents. The ponderal index is calculated by dividing pilot weight (in kilograms) by the body surface area (in meters squared). The excessive relative weight category is one area where a pilot may change cohort status through self-induced life-style alterations (better management of caloric intake and physical activity).

AGE COHORT

As the professional pilot groups progressively age, the safety record has improved in parallel. This is not coincidental. This improved safety is directly attributable to the greater experience and enchanced judgement that characterize the healthier, mature pilots who are increasingly producing for the airlines today. In the realm of "aging deteriorations," old myths often die hard, and actual "disinformation" confuses issues. Modern computer-era data analyses are rapidly dispelling the now-obsolete concepts about aging, gender and other constitutional characteristics.

Analyses of pilot accident rates during the period 1976-1980 show that, "On the basis of recent flight time alone, pilot accident rates decrease as flight time increases." The analyses add, "This holds for both Class III pilots and for the entire pilot population [9]."

In addition, the same reference concludes that "All pilot classes with over 50 hours of recent flight time and over 1,000 hours of total flight time exhibit the lowest accident rate for all age classes." These "exposure" data highlight the principle that the pilot who promotes proficiency and practices accident prevention will move into the (higher-exposure) cohort and will be at less risk from the accident standpoint.

The same report notes that recent flight time "can be viewed as a measure of pilot proficiency," since pilots with more recent

PILOT AGE AND ACCIDENTS: 1978

Pilots in Command With
Airline Transport or Commercial Pilot Certificate

Age	Active Pilots 1978	No. Accidents Expected 1978	No. Accidents Observed 1978	Accident Per 1,000 1978
16-19	374	3	8	21
20-24	10,839	92	167	15
25-29	26,102	220	312	12
30-34	45,011	379	414	9
35-39	41,742	352	321	8
40-44	35,270	297	236	7
45-49	28,012	236	214	8
50-54	19,660	166	164	8
55-59	22,499	190	131	6
60+	12,205	103	71	6
	241,714	2,038	2,038	

FIGURE 1

PILOT AGE AND ACCIDENTS: 1979

Pilots in Command With
Airline Transport or Commercial Pilot Certificate

Age	Active Pilots 1979	No. Accidents Expected 1979	No. Accidents Observed 1979	Accidents Per 1,000 1979
16-19	468	4	7	15
20-24	11,839	90	160	14
25-29	25,755	196	294	11
30-34	44,606	341	359	8
35-39	42,520	324	309	7
40-44	35,031	267	209	6
45-49	29,585	225	191	7
50-54	18,803	143	149	8
55-59	23,073	176	123	5
60+	14,069	107	72	5
	245,749	1,873	1,873	

FIGURE 2

PILOT AGE AND ACCIDENTS: 1980

Pilots in Command With
Airline Transport or Commercial Pilot Certificate

Age	Active Pilots 1980	No. Accidents Expected 1980	No. Accidents Observed 1980	Accidents Per 1,000 1980
16-19	468	3	15	32
20-24	13,020	93	153	12
25-29	26,602	189	266	10
30-34	43,430	309	361	8
35-39	43,560	310	270	6
40-44	36,223	257	230	6
45-49	30,572	217	196	6
50-54	19,769	141	128	6
55-59	22,359	159	105	5
60+	17,008	121	75	4
	253,011	1,799	1,799	

Source: NTSB and FAA Statistical Handbook for CY 1980

FIGURE 3

flight hours have fewer accidents. It also points out that "pilots with more total flight time could be expected to exhibit a lower accident rate than pilots with less total flight time."

CORROBORATING STUDIES

Corroborating studies utilizing FAA and NTSB accident data of pilots flying in general aviation who have earned pilot-in-command air transport and commercial pilot certificates reveal the steady decrease in the number of accidents that occur with increasing age (See Figures 1, 2, 3 and 4). Student and private pilots are not included so that the factor of beginning proficiencies can be eliminated.

The observed actual aircraft accident rate begins to rapidly decrease in the 30s cohort age groups, with the trend continuing to decrease past 60. The data show this year after year. It has, therefore, never been found justified by the FAA to place an upper age limit on general-aviation pilots (6). The FAA reports 35,154 active pilots over the age of 60 as of Dec. 31, 1982 (1). This cohort is greater than the total number of active pilots in most individual countries of the world.

In regard to the above-discussed exposure aspect, it is noted that how a person flies, not the total hours aloft - or "exposure" to the air - determines air safety in the main. "Well over half of all aviation accidents" are caused by pilot errors (2). A small number are due to primary airframe structural or system failure or an external force out of the control of the pilot.

"Exposure" as a factor cannot be cited in those accidents where pilots elect to (1) deliberately penetrate known adverse weather beyond pilot or aircraft capabilities (2), impetuously perform an unwarranted low-level maneuver or (3) fly while impaired by alcohol, drugs, emotions or disease. As the years pass, the safer young pilots, through increasing judgement and experience, become the older pilot cohort and contribute to the outstanding safety record produced by older pilots.

Some pseudo-scientific "epidemiologic" apologists for the incredibly poor flying that accounts for most of the pilot-"error" accidents equate piloting with Russian Roulette, that is, the more one flies, the more likely one is to experience an accident.

Nothing could be further from the truth (7). For example, active instructors as a cohort group fly far more than most others. Instructional

PILOT AGE AND ACCIDENTS: 1981

Pilots in Command With
Airline Transport or Commercial Pilot Certificate

Age	Active Pilots 1981	No. Accidents Expected 1981	No. Accidents Observed 1981	Accidents Per 1,000 1981
16-19	330	2	8	24
20-24	12,565	92	160	13
25-29	25,735	189	258	10
30-34	36,770	270	355	10
35-39	41,735	306	272	7
40-44	34,532	253	207	6
45-49	29,556	217	166	6
50-54	20,295	149	131	6
55-59	18,609	137	109	6
60+	18,764	138	87	5
	238,891	1,753	1,753	

Source: NTSB and FAA Statistical Handbook for CY 1981

FIGURE 4

SAFETY RECORD

of U.S. Certificated Air Carriers All Scheduled Service, 1969-1979.

Year	Departures	Accidents	Accidents Per Million Aircraft Miles
1969	5,377,000	51	.021
1970	5,100,000	43	.018
1971	4,999,000	43	.018
1972	4,966,000	46	.020
1973	5,134,000	36	.015
1974	4,726,000	43	.019
1975	4,704,000	30	.013
1976	4,835,000	22	.009
1977	4,934,000	20	.008
1978	5,013,000	19	.008
1979	5,050,000	23	.008

Source: Air Transport Association of America 1980 Annual Report.

FIGURE 5

Median Age of Crewmembers by Seat and Age

Year	Captain	First Officer	Second Officer	Total
1968	46	35	31	36
1969	47	34	30	35
1970	46	35	31	37
1971	47	37	32	38
1972	48	37	33	39
1973	49	38	34	40
1974	54	44	40	45
1975	51	40	36	41
1976	51	41	37	42
1977	51	41	38	43
1978	51	42	38	43
1979	51	42	37	44
1980	51	43	39	44
1981	52	45	41	46

FIGURE 6

flying is characterized by accident rates in the lowest levels.

In addition, corporate and airline pilots fly hundreds of hours each year and regularly produce very low accident rates. These pilots fly with care, utilizing judgement and experience. There are some pilots who fly rarely, as previously noted, producing during each flight a self-induced hazardous adventure. These "low-exposure" pilots comprise a high-risk group for accidents.

AIR-CARRIER PILOTS, LOW RISK

The U.S. certified air carriers demonstrate a progressively improving safety record as shown by the U.S. Air Transport Association 1980 Annual Report for the 1969–1979 period (See Figure 5). Accompanying the decreased accident rate has been the increasing median age of captains and, correspondingly, other cockpit crew members (8) (See Figure 6).

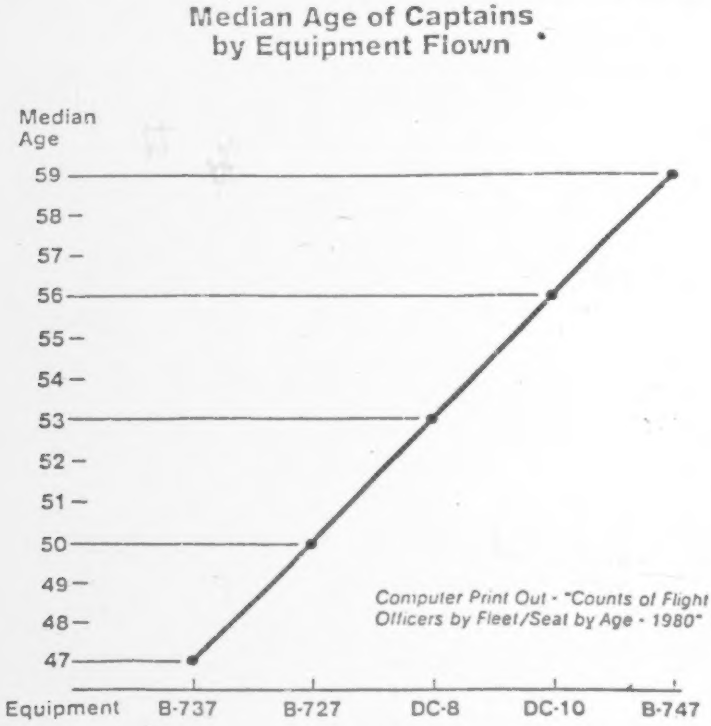
In addition, the older captains were assigned to the larger wide-bodied aircraft (See Figure 7).

For the same airline during this period, NTSB records show that the ages of the accident-involved crewmembers were in the lower age ranges relative to older crew cohorts who pilot the larger aircraft virtually accident-free (See Figure 8).

As shown, higher chronologic age levels are consistently associated with lower accident rates, because the older pilots' performance reflects the effects of increasing experience and judgement. There are many proficient young pilots, and these become the superb older pilots. There are, unfortunately, pilots in the younger group, who, because of self-induced dangerous flight behavior, will never become members of the older age cohort.

It is reemphasized through Figure 7 that wide-bodied jet transport aircraft, comprising the largest, more-expensive and complex types of civil aircraft, with the potential for the greatest loss of life and property damage, are entrusted to the more-senior, most-experienced pilot and flight-engineer cohorts.

This is not accidental. The relatively



Median Age of Captains by Equipment Flown

Computer Print Out - "Counts of Flight Officers by Fleet/Seat by Age - 1980"

FIGURE 7

high wide-bodied aircraft operational safety record is the direct result of the utilization of these highly competent older, experienced crewmembers. There are currently in the U.S. more than 300 airline flight engineers who are over 60 years of age (including well over 100 who are former airline captains) and who are producing quality work for their airlines. The contributions to the cockpit crew resources and to the excellent air safety record by this outstanding crew cohort should be appreciated and is fully documented by airline, FAA and NTSB records.

COMMENT

Today's aircrew members are most often selected by physical, behavioral and historical criteria that initially stratify candidates according to long-term career retention probabilities. Some companies exclude from selection, for example, cigarette smokers, individuals who comprise a group with distinctly higher probabilities for subsequent medical disqualification. It behooves those who seek to join the ranks of airline or corporate pilots to take control of their health. To do otherwise is to promote failure to enter, or premature subtraction from, the taxonomic rosters of pilots.

CONCLUSION

The taxonomic data presented herein demonstrate that the U.S. civil pilot population consists of persons who can be catalogued in all shapes, colors, sizes, types and ages. Over periods of time, given pilots rise or fall in proportion to piloting skills, judgement, experience, health and motivation.

Attempts to ascribe flight safety coefficients on the basis of taxonomical segment alone will always fail, because the individual characteristics of freedom from impairing disease, ability to perform and motivation to fly are the predominant factors in safe performance.

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Age of Flight Deck Crew Members for Accidents in Which Jet Hulls Were Lost 1965-1979

Date of Accident	Location	Age of Captain	Age of First Officer	Age of Second Officer
8/16/1965	Lake Michigan	42	34	26
11/11/1965	Salt Lake City	47	39	28
3/21/1968	Chicago - O'Hare	40	28	34
1/18/1969	Los Angeles	49	33	29
7/19/1970	Philadelphia	46	25	32
12/8/1972	Chicago - Midway	44	43	31
12/18/1977	Kaysville, Utah	49	46	34
12/28/1978	Portland	52	45	41
	Average Age:	46.1	36.6	31.9

Source: NTSB Aircraft Accident Reports.

FIGURE 8

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AIRCREW PHYSICAL STATUS AND CAREER LONGEVITY

by

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INTRODUCTION

Advances in medical science during recent years have resulted in U.S. Federal Aviation Administration (FAA) medical certification of aircrew members who in earlier times would have been denied certification. Persons diagnosed as having alcoholism, coronary heart disease, cardiac dysrhythmias and various other illnesses are now individually certified in many instances.

Today, for example, more than 500 abstinent alcoholic pilots are medically certified because of progress in the medical sciences, including psychiatry, neurology, psychology and physiology (16).

By the end of March, 1983, 1,225 pilots who had experienced myocardial infarction have been recertified (34 first class, 137 second class and 1,054 third class), as have 435 pilots who have had coronary artery by-pass surgery (15 first class, 35 second class and 385 third class) (16).

Such progress has been made possible by studies conducted by the FAA, especially the Civil Aeromedical Institute; the American Medical Association (neurologic aspects of aviation safety); the American College of Cardiology and other groups (3)(5)(6). A few pilots also have now been recertified with aortic porcine valves and pacemakers (16).

In addition to the above, there are approximately 5,000 pilots with monocular vision who are recertified, as well as 18,000 with color vision deficiencies and 43,000 with substandard visual acuity (16). About 500 recertified pilots have missing limb components (16). Further medical statistics are available from the FAA (1).

PHYSICAL STATUS, DEMOGRAPHIC CHARACTERISTICS

The causes of air crew medical certification loss have been documented by a major airline for the period 1938 to 1981 (9)(14). These are listed in Figure 1. Cardiovascular diseases (42.2% - mean age 49.8 years), cancers (10.1% - mean age 47.2 years), cerebrovascular disease (5.8% - mean age 48.5 years), psychiatric disorders (9.4% - mean age 43.5 years) and diabetes mellitus (7.5% - mean age 41.1 years) constitute the major disease categories within which medical certification is lost. It will be noted from Figure 1 that the preponderance of mean ages at the time of initial grounding fall within the 40s age bracket.

Figures 2 and 3 provide bar graph illustrations of medical groundings by age of flight officers based upon Figure 1 for the years 1979 and 1980 respectively. It can be seen that most of the medical groundings per age cohort are well below the 1% level, and in no case - even at the most advanced ages - do the medical groundings reach 2%.

These two figures clearly portray the high degree of health status enjoyed by airline pilots. Competent authorities assert that, as a group, airline pilots are the healthiest persons in the world (10).

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From the years 1938-1981, the airline whose data appear in Figure 1 was able to achieve a substantial return to flight status by previously permanently grounded flight officers (see Figure 4). These flight officers had sufficiently responded to medical treatment to enable their safe return to flight status.

Figure 5 presents the age break down of permanently grounded flight officers who were later returned to flight status for the period March 15, 1960, through 1981. The data show that persons in all age groups were represented by those who were returned to flight status, with the bulk of them in the 35-54-year age span.

INFLIGHT INCAPACITATION

Inflight incapacitations of cockpit crew members in the documented population is portrayed in Figure 6. Acute stomach and intestinal tract problems lead the list of causes for inflight aircrew incapacitation. The data in Figure 6 cover the years March 15, 1960, through 1981. Lesser causes are loss of consciousness, kidney stones, myocardial infarction, mental problems and a few miscellaneous conditions.

These inflight incapacitations occurred in all age groups (20-29 years = 17; 30-39 years = 17; 40-49 years = 18; 50-59 years = 17; four incapacitations were of unknown age). Acute intestinal illness can occur, of course, at any age, as can a kidney stone attack or alcohol withdrawal convulsions or other incapacitation causes.

A computation of the rate of inflight cockpit aircrew incapacitations for the airline per departure for the March 15, 1960, through 1981 period is provided in Figure 7. It is noted that no passenger injuries or fatalities resulted from inflight incapacitations on this airline. The rate of incapacitation during the period is 59 out of 11,302,742 departures. This computes to one in every 192,308 departures, (giving a ratio of 0.0000052), an exceedingly low rate.

This airline has for years conducted a training program for cockpit aircrew members that enables them to recognize and deal with inflight incapacitation of any crew member. A study by P.J.C. Chapman, of British Caledonian Airways, has shown that cardiac causes could be forecast to possibly result in an accident every

Permanent Grounding of Flight Officers
by Medical Category and Mean Age*
1938 - 1981

Cause of Grounding	%	Mean Age
Cardiovascular diseases	42.4	49.8
Cancers	10.1	47.2
Cerebrovascular	5.8	48.5
Seizures	2.1	38.8
Other neurologic disorders	3.5	42.6
Dementias	2.5	52.9
All psychiatric disorders	9.4	43.5
Diabetes	7.5	41.1
Gastrointestinal	1.0	50.8
Visual disturbances	2.9	49.2
Hearing disturbances	2.7	49.8
Miscellaneous	6.3	48.8
Unknown	3.8	-
	100.0%	

*Excludes Navigators and Persons later "ungrounded".
"Age" is the age when removed from flight status.

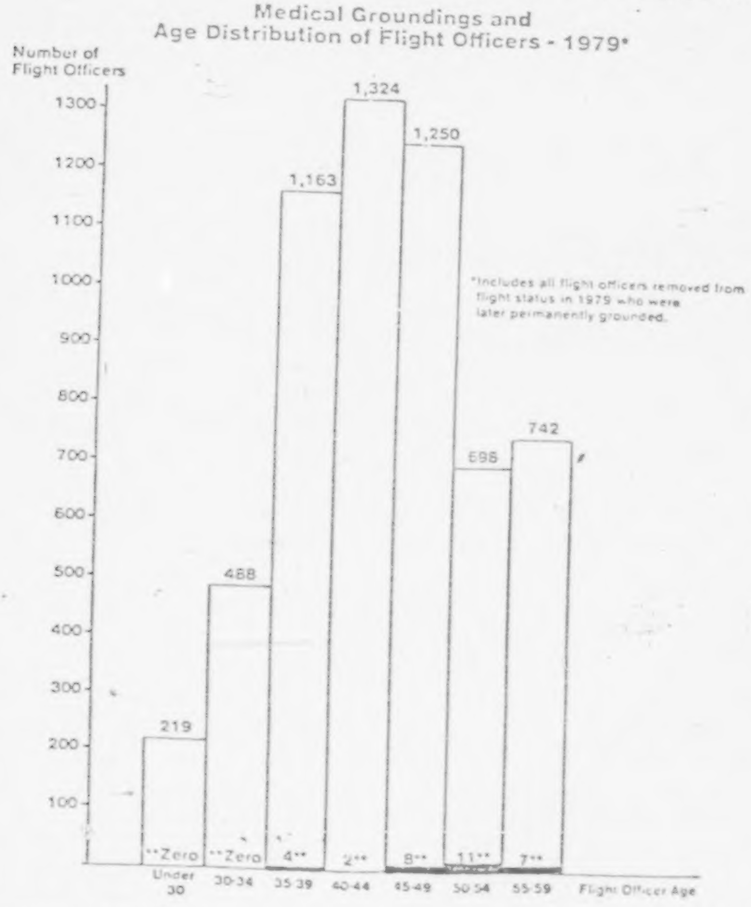
FIGURE 1

8,307,082,800 flying hours, if one assumes that one out of 400 inflight cardiovascular incapacitations results in an accident [4]. The 400 figure comes from reports by International Air Transport Association carriers that one can expect an accident from cardiac causes every 400 years.

Reighard and Mohler have documented that, on the average, one cardiovascular inflight death of a captain occurred each year between 1951 and 1965, a figure about the same as that of today [15]. The above computations, as pointed out by Chapman, reveal that the safety risk rate now being achieved in commercial operations in respect to pilot incapacitation is 10 times better than that required by airworthiness criteria for vital aircraft systems and structures.

As documented in this paper, the rigid and absolute application of published medical standards to cockpit aircrew is not justified in many individual cases. Numerous pilots and flight engineers, through modern medical assessment, can be returned to active flight status after being "permanently" grounded for cardiovascular or other disease states. Many have done so.

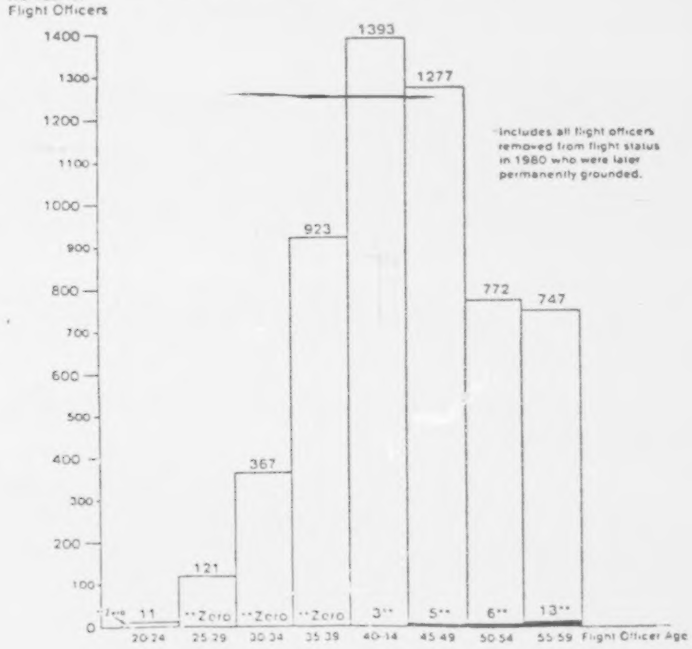
Figure 8 lists the deaths of cockpit crewmembers of the documenting airline who died



**Based on age when removed from flight status in 1979.

FIGURE 2

Medical Groundings and
Age Distribution of Flight Officers*



*Includes all flight officers removed from flight status in 1980 who were later permanently grounded.

**Based on age when removed from flight status in 1980.

FIGURE 3

"Permanently" Grounded Flight Officers Later Returned to Flight Status ("ungrounded") by Medical Category and Mean Age at Initial Grounding*
1938 - 1981

Cause of Grounding	%	Mean Age
Cardiovascular diseases	48.7	44.5
Neurologic disorders	20.5	41.5
Seizures	2.6	49.0
All psychiatric disorders	5.2	44.5
Visual disturbances	12.8	44.8
Miscellaneous	10.2	50.0
	100.0%	

*Excludes Navigators. "Age" is the age when removed from flight status.

FIGURE 4

during the period March 15, 1960, through September, 1979. Note that none of these crewmembers died in flight. The median age of death for these 180 crewmembers was 43 years.

Inflight deaths can, and do, occur in all age groups. In this respect, an upper age limit of 60 has bever been found to be justified for U.S. flight engineers (second officers), and modern medical progress has vitiated the basis for an airline pilot upper age limit (11).

DISCUSSION

The age, gender, size and race characteristics of the U.S. pilot population were described in an earlier issue of the HUMAN FACTORS BULLETIN (12). Information in this paper covers modern medical aspects of pilot certification.

The chance of an air crewmember experiencing a permanent medical disqualification is quite low, as shown in the figures portrayed herein. An analysis by R. R. Orford and E. T. Carter has shown that air crewmembers employed by Northwest Airlines have only a 20% chance of not reaching retirement because of medical reasons (13).

C.R. Harper has documented that United Airlines, a company that also has a medical department, has five fewer permanent medical groundings per year per 1,000 aircrew than airlines having no medical department (8). He further provides a statement on a preventive program successfully utilized by some previously disqualified pilots with cardiovascular disease (7).

As provided by R. Anderson and C.C. Gullett, former medical directors of Trans World Airlines, companies can do their part in maintaining crewmember medical status by supporting effective medical departments (2). They show that one third less pilot disability

Age Distribution of Flight Officers
"permanently grounded" Who Later Returned to Flight Status.
March 15, 1960 through 1981.

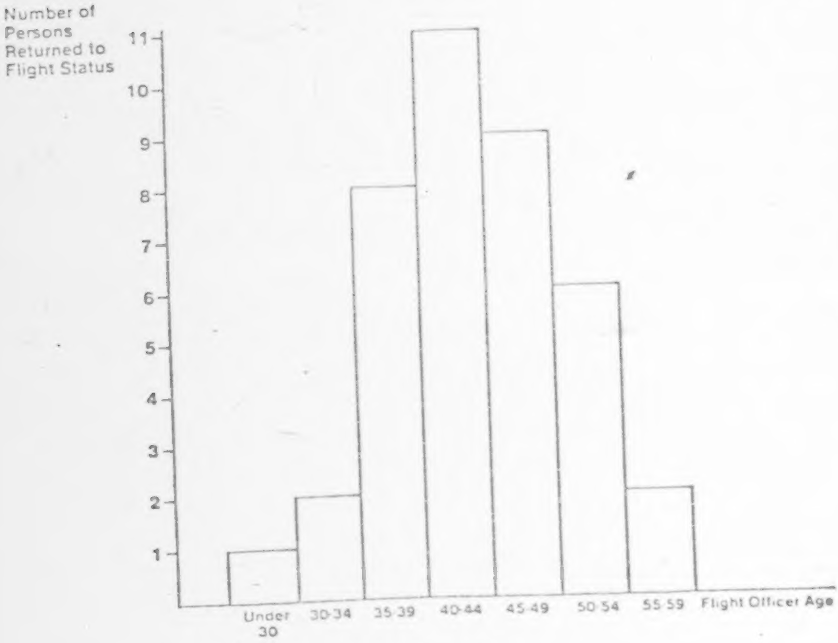


FIGURE 6

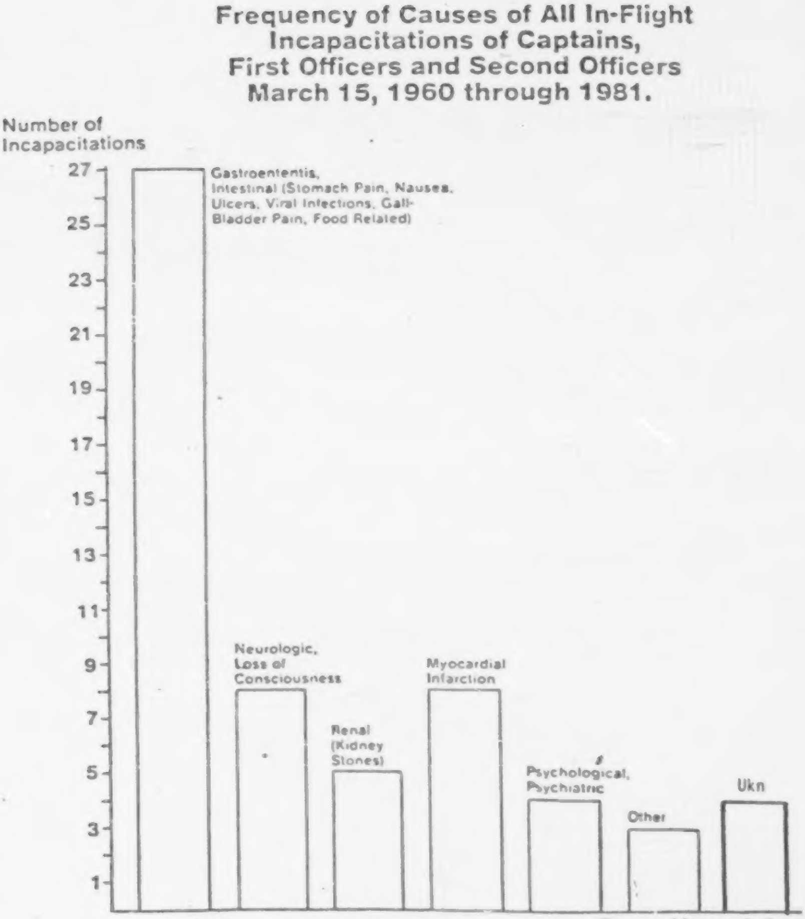


FIGURE 6

can be achieved through preventive medicine programs that decrease the amount of disqualifying disease among flight crewmembers. For Trans World Airlines, this amounted to a total cost avoidance during 1976-79 of $26,190,418, providing a benefit/cost ratio of better than 6:1.

As further documented by Harper, enhanced pilot retention through a preventive medicine program results in annual savings to his airline of $15,220,000 (8). The savings in medical disability payments (average duration = 8.5 years) of 55% of salary and 18% fringe benefits, coupled with the savings brought about by daily airline physician medical consultation and hearing conservation programs, give the airline medical department a benefit/cost ratio of 5.2 to 1. This is very close to the Anderson and Gullett findings.

CONCLUSION

Individualization of aircrew medical certification is currently practiced at the highest levels ever. Companies with effective medical programs can provide significant assistance to their aircrew members in this respect. The application of modern medical science in aircrew preventive medicine programs and medical certification procedures constitutes a true revolution in modern aviation progress. Increasing opportunities for expanded efforts in these areas exist.

Rate of Flight Officer In-Flight Incapacitations per Departure March 15, 1960 through 1981

$$\frac{59 \text{ In-flight incapacitations (3/15/60 - 1981)}}{11{,}302{,}742 \text{ departures (3/15/60 - 12/31/81)}} = .0000052^{*}$$

Number of injuries or fatalities to passengers as a result of in-flight incapacitations 3/15/69 - 1981 0

1 in every 192,308 departures.* FIGURE 7

Deaths of Captains, First Officers, and Second Officers March 15, 1960 through September, 1979

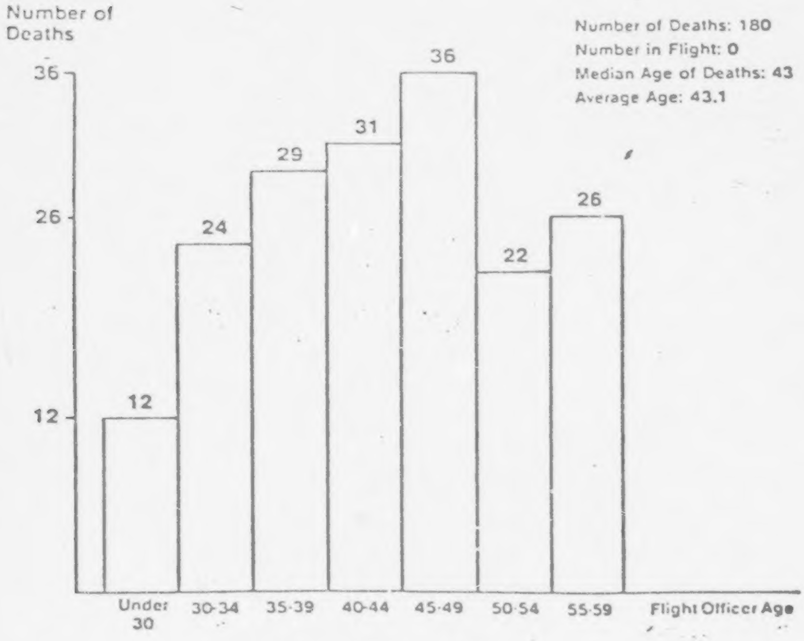


FIGURE 8

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Reasons for Eliminating the "Age 60" Regulation for Airline Pilots

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MOHLER S R. *Reasons for eliminating the "age 60" regulation for airline pilots.* Aviat Space Environ Med 52(8):445-454, 1981.

The calendar age of 60 is no longer medically justifiable as an upper age limit for airline pilots. Advances in gerontologic studies, clinical medicine, and operational flight proficiency evaluations, now allow individual pilot assessments for health status and performance capability. Individualizing the career duration of pilots by eliminating the present age 60 upper limitation will enhance flight safety and efficiency as the highly qualified, experienced, and proficient older healthy pilots continue their productive careers.

THERE IS today no medical, physiological, psychological or operational justification for retaining the calendar age of 60 as a mandatory career cut-off for an airline pilot. Age alone, as is the case with race or sex, gives no information about an individual's competency or health.

The three critical determinants of pilot fitness are: freedom from impairing disease, ability to perform and desire to continue flying.

This paper will explore the interrelationships of the normal aging process, diseases, and flight record, including performance as demonstrated in accident statistic trends by different age groups.

BACKGROUND

The U.S. "Age 60 Rule" for forced airline pilot retirement is contained in "Part 121" of the Federal Aviation Regulations. It is two decades old (52). The reasons why the rule is no longer justified are documented in the 1979 Hearings of the Subcommittee on Aviation, Committee on Public Works, U.S. House of Representatives (55). Unfortunately, the original justifying records have been misplaced (19). However, there are adequate assessments today that document the no-longer-tenable basis of the regulation. The rule does not apply to flight engineers or any other flight crew member. Neither does the rule apply to air commuter or air taxi operations governed in "Part 135" or to various flight activities involving charter or other non-121 operations.

While working at the Center for Aging Research, National Institutes of Health, the author and G. H. Hunt studied the scientific literature in the field of aging as of 1958 and published an assessment of its status as of that time (35). In 1961, the author correlated the current level of knowledge concerning the field of aging, medical diagnosis and treatment, with the airline flight technology of that time (50). A further review of the field of aging was made in 1961 (51). In 1973, a new assessment of research findings in aging along with developments in disease detection as related to airline pilot retirement was published (52). Further progress in understanding the aging process as this bears on pilot performance was published in 1978 (54). A year later, a consolidated and updated status concerning the matter of airline pilot age and flight duties was provided (56).

It is now clear that the evolution of understanding and knowledge about the normal developmental aging process and the pathophysiology of specific acquired diseases, has given us new insight concerning individual health. This and the new diagnostic and disease prevention techniques have revolutionized the thinking about who is, or isn't, healthy and, consequently, fit to fly. Parallel advances have occurred in flight technology, including flight simulator fidelity. This latter field has progressed to the stage (especially in the aspect of high-quality optical displays) that it is now feasible to give an airline pilot the necessary training for a new type of aircraft in a simulator (26). The first time a captain actively flies the aircraft can be in revenue, passenger-carrying flights, if the new procedures are followed.

THE AGING PROCESS

The normal, genetically programmed development of an individual is a life-long continuum that results ul-

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timately in the terminal involuntional subtraction of the aged individual from the population (17). The entire lifespan is a developmental process—a functioning, normal process totally distinct from acquired diseases (69).

Human lifespan potential in the 20th century is reaching 100-120 years, depending upon lifestyle, environment, and genetic strain and diseases (17,67). The changes with age involve modifications of functions and structures, but to describe, for example, graying hair in pejorative terms is to fall victim to arbitrarily adopted sociocultural concepts. Graying of the hair, as with all other normal aging changes, is a developmental change, no more, no less. Until the ultimate involutional changes of advanced age occur, these aging changes have no bearing upon an individual's ability to perform.

Many things improve with age, including judgment and intelligence (16). Experience enhances judgment and older healthy persons tend to be less impulsive, and consequently, have better safety records (37). Sonnenfeld points out that factual evidence of older workers' performance rejects the "stereotyping" and prejudices that link age with senility, incompetence, and lack of worth in the labor market (70).

Improvements from 1901-75 in survival into old age as seen in U.S. males are shown in Fig. 1. The trend for subsequent years continues to be a marked continuation of greater numbers of individuals extending into the older age area. For individuals whose lifestyle and environment promote the full potential of their genetic endowment, healthy survival into the 90s and even into the early 100s is feasible as illustrated in Fig. 2.

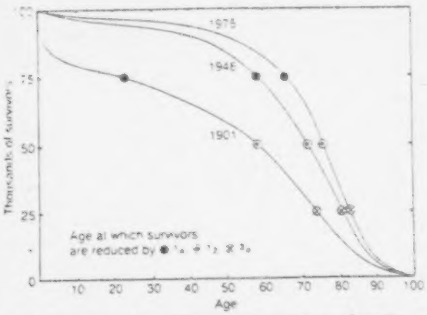


Fig. 1. Survivorship and life expectancy has consistently improved into the ninth decade (17). The 1980's are seeing a further shift to the right of the survivorship curve as advances in preventive, diagnostic, therapeutic, and surgical medicine escalate. Improvements in life-style and individual health awareness are expected to increase the shift to the right.

Fries has recently shown that the average length of life in the U.S. has risen from 47 to 73 years in this century, and that this length is moving toward an ideal average lifespan of 85 years for the present cohort of young adults (28). Fries' model demonstrates a national health pattern of continuing decline in premature death plus an emergence of natural death at the end of a realized natural lifespan. Postponement of the disease phenomena previously identified with "aging" by present social interactions, health promotion, and personal autonomy, is highlighted by Fries. Life in the older age brackets has continued, for those who realize their potential, to be physically, intellectually, and emotionally vigorous and productive. This achievement, of course, is inhibited by externally imposed constraints, as typified by arbitrarily imposed upper age limits for employment or other activities. Current life tables reflect the data on the greater numbers of healthy persons extending into advanced age (21,59). Many of the conditions previously construed as "aging"—for example, atherosclerosis, emphysema, and other acquired conditions—simply take a number of years to develop in susceptible persons; hence, the confusion by some with the normal aging process.

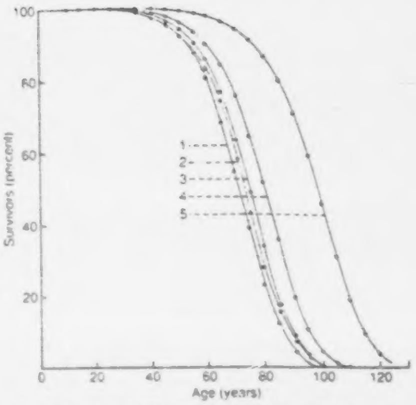


Fig. 2. Rosenberg (67) prepared plots of predicted survivorship for humans, as shown, assuming that the three major causes of death were controlled. Curve 1 is that of Caucasian U.S. males, 1967, and has a median survivorship of 71.8 years. Curve 2 assumes that vascular lesions are cured, with median survival calculated at 73.0 years. If cancer is controlled, the median survival is 74.8 years (curve 3), while if heart disease is controlled, the median survival is estimated at 80.5 years (curve 4). If all three diseases are controlled, the median survival is estimated as 98.8 years.

One reason confusion has been rampant concerning the distinction between changes due to diseases and those due to the normal aging process is that medical schools have traditionally correlated the two as synonymous. This is partly due to centuries-old cultural bias and partly to narrow faculty training (14). The concepts of Charcot, as published in 1881, confusing diseases with the aging process, are still operating in the minds of many (15).

Cross-sectional studies of age have tended to support confused views of which changes are due to age and which are due to disease. For example, the largest study of vital capacity "as related to age" was done by John Hutchinson in 1846 (36). He made measurements in more than 2,000 "healthy" males and concluded that vital capacity is inversely proportional to age. Somehow, over the decades, the composite findings became medical axioms, ignoring the great individual variations with age. New tables of pulmonary function data were published by Kory *et al.* in 1961, but these included smokers (43). Pulmonary function standards in accepted general use were not derived from subjects who, for example, were screened for cigarette smoking until the report of Morris *et al.* in 1971 (58).

Morris *et al.* rectified the "smoker" defect of previous pulmonary function studies by performing studies on healthy nonsmokers. This approach of excluding persons whose life-style included cigarette addiction—with tobacco tar destruction of their pulmonary tissues and consequent degrees of chronic obstructive pulmonary disease—resulted in a 10-year improvement in adult pulmonary function tables (Table I).

TABLE I. VITAL CAPACITY: 70 INCH TALL CAUCASIAN MALES

Age	1961	1971
30	5.0	5.3
40	4.8	5.1
50	4.6	4.8
60	4.4	4.6
70	4.2	4.4

1961 data includes smokers (43)
1971 data excludes smokers (58)

Through excluding smokers from the studies (that is, persons whose self-destructive practices produce a greater degree of chronic obstructive pulmonary disease), Morris, *et al.*, rolled the average norms for a given age bracket back an entire decade.

There is wide individual variation in changes with age at all age groups. This is one of the primary findings in the longitudinal age study conducted by Shock and associates in Baltimore (69). Although certain physiologic functions based on population averages show a change toward less capacity in older age groups, the important factor is that there is a tremendous variation among individual capabilities in a given age group. For example, the cardiac stroke index group mean declines somewhat with age but, as shown in Fig. 3 by data obtained by Landowne, there are healthy 70-year-olds (and older) who outperform others in this respect in their 30s (44). Present capacity to perform by an individual is the significant point, not the chronological age.

MENTAL FUNCTIONS AND AGING

It is now understood that senility (senile dementia) is not a part of the aging process (13,75,79). Only about one in five persons of advanced age will become "senile" and there are tests available that determine this syndrome. A proportion of these victims suffer from Alzheimer's disease, an entity receiving considerable attention. Some have hypothesized a possible viral etiology.

Similarly, earlier concepts that "crystalizing of the thought process," loss of "creativity," or other cognitive changes with age, were experienced by all are now known to be fallacious (24). The healthy, undepressed, interacting brain continues to function irrespective of age. If a person believes that higher mental functions deteriorate with age, he may induce a depression that can bring about an altered self-assessment of capability (38). The individual literally becomes his or her own self-fulfilling prophecy. The phenomenon is analogous to the "burn-out" syndrome found in some air traffic controllers. In a detailed study of controllers, Rose *et al.* found that, when the belief exists that air traffic control work causes deterioration of the nervous system, a believing controller is at risk of manifesting "burn-out" (66).

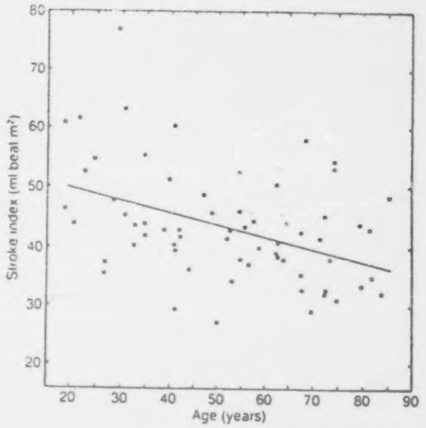


Fig. 3. Data collected by many scientists in numerous studies show a great variation in individual capability with age. Landowne (44) found a superior stroke index in many older persons compared to that in a significant proportion of younger individuals.

Studies by Lehman of some creative persons indicated that creativity peaked in young adulthood and declined thereafter (45). These studies failed to recognize that as many of the subjects grew older, especially the scientists, they elected to move out of the laboratory and into administration, a setting without the same types of creative pursuits as the lab (16). Some of the more significant products of human creativity have come from persons in their 70s and 80s—Tolstoy, Hugo, Verdi, Darwin, Liszt, Chagall, Monet, Michelangelo, Picasso, Ibsen, and Franklin, to name a few, and not forgetting Shaw, who created actively to the age of 96. Some of the great creators lost their abilities due to disease in midlife. Others became alcoholics or addicts, or went into depressions with consequent loss of creative functions. Bullough *et al.* have documented that creativity continues past 80 (9).

Butler has pointed out that changes due to diseases and social stress must be separated from changes due to normal aging (12,14). He also notes that there is, for example, no noticeable difference in cerebral blood flow in healthy, elderly men from that of healthy 20-year-olds (14). This is new knowledge which offsets the older concept that the brain loses blood flow with age. In addition, Butler and associates point out that many brain function changes attributed to "age" are actually reversible brain syndromes based on, for example, drug reactions, overprescription of drugs, tranquilizers, alcohol abuse, and other specific conditions due to aging (63).

Butler comments that the confusion by some physicians concerning the above topics may well be due to the fact that, as of 1978, only 50 of 120 U.S. medical schools gave any instruction in geriatric medicine (14). Medical students often get their first impressions of aging as a "disease" associated with death when they are assigned their cadaver, as noted by Butler. He observes that medical school training gives little exposure to healthy older persons; during this training, concepts equating age, disease, and death, all become hardened.

Eisdorfer stresses that the results of numerous longitudinal studies do not support the hypothesis of a progressive loss of cognitive functioning with advancing age in all persons (24). He notes that many studies purporting to show cognitive decline have actually measured functions in persons who were depressed. Depression, of course, can occur in individuals at any age, and is not a necessary concomitant of aging.

Busse emphasizes that cross-sectional "studies" of intelligence and related functions have reported declines for those over 60-65 years of age, but that these studies were methodologically flawed (11). He points out that longitudinal studies demonstrate clear increases of intelligence into mid-adulthood and that the onset of disease or adverse socioeconomic factors are then responsible for declines.

HEALTHY OLDER PERSONS

Studies are increasingly demonstrating that the 20th century sedentary life-style adopted by many is having an adverse effect on central nervous system functional efficiency. Those who avoid the bodily deteriorations accompanying physical inactivity, nicotine addiction, tobacco use, alcohol and drug abuse and other self-destructive behaviors, do not show the cognitive function deteriorations reported so frequently in poorly discriminating cross-sectional studies. For example, Young has shown that a 10-week program of jogging, calisthenics, and recreational activities gave improved scores on the Wechsler Adult Intelligence Scale Digit Symbol and Block Design tests, trail-making (brain function), crossing off (speed of performance) and Associate Learning (80). The subjects showed an increase in health status rating and a decrease in anxiety. Those who exercise derive beneficial effects on cognitive functioning and personality. Since many earlier concepts of age deteriorations have been based on studies of sedentary, actually ill, persons, the newer knowledge is refuting these generalizations.

Spirduso and Clifford have shown that 70-year-old physically active persons (racquet ball sports or jogging, for example) can have simple, complex, and choice reaction times equivalent to those of sedentary 30-year-olds (72). Szafran has demonstrated the remarkable maintenance of higher mental functions in healthy older pilots drawn from the active pilot group (74). Spieth has shown that pilots with diagnosed heart disease had a greater deterioration of mental function than healthy older pilots (71).

Complicating the data concerning cognitive functions in various age groups is the matter of regular alcohol or drug use, a factor not controlled in many study populations. Parker and Noble have found that alcohol drinking at social levels results in a deterioration of abstract thinking as shown by decrements in adaptive abilities, concept formation, and capacity to shift from one idea to another (62). This and the previous studies demonstrate the error of attributing to age those changes actually due to inactivity, disease, alcohol, and other factors extrinsic to the normal aging process.

LONGITUDINAL STUDIES

Six longitudinal studies are of specific significance in providing data on normal aging and the occurrence of pathological changes. These are the "1,000 Aviator" Study begun in 1940 and still underway today (the author served as FAA monitor of the study in the 1970s) with the subjects now in their 70s (53); the Gerontology Research Center study in Baltimore begun under Nathan Shock in 1958, with about 1,000 subjects, the oldest in their 90s (69); the Duke University longitudinal study, "The Effect of Aging Upon the Nervous System," begun in 1955 by Dr. Ewald Busse with 267 non-institutionalized persons age 60-94 (11); the "Adaptation Study" at Duke using Schaie's "cross-sequential" technique (four 6-year cohorts with an overall 6-year time of measurement), started in 1968 with 502 persons ages 45-69 (11); the Framingham Heart Study, begun in 1948 and currently the longest uninterrupted detailed study of risk factors over time in the development of heart disease and strokes (41); and the Seattle Heart Watch, begun in the early 1970s and yielding practical clinical techniques for detecting cardiovascular disease in individuals, with forecasts of the likelihood they would experience a cardiac event in the next 6 months, 12 months, or 5 years (7).

The "1,000 Aviator" study found that, as of 1977, 95 of the subjects had died of non-military causes, while 208 matched non-pilots of similar background had died (47). This marked decrease in deaths is attributed by the investigators to factors including a good socioeconomic background, long-lived parents, above-average intelligence, an orientation toward health and fitness, and periodic physical examinations that provide early detection and treatment of any developing diseases. The U.S. Navy has acted on available aging data and has eliminated upper age limits for pilots, basing flying status on individual health and capability (1). The Air Force has also updated its approach to pilot physical standards in regard to disease detection (20).

In addition to the above, the Federal Aviation Administration contracted with Assessment Systems, Inc., for cognitive and perceptual motor tests on subjects drawn from the "1,000 Aviator" group (77). These studies demonstrate that 60-67-year-old subjects in the group showed no differences compared with healthy 30-34 year-old comparable persons in visual scan or color word tests. There were no age differences in judgment assessments concerning goal discrepancy, attainment discrepancy, or judgment discrepancy. On other tests, many over-60 individuals outperformed a substantial number of younger persons.

The same contractor has studied 6,000 pilots from several airlines, including United, Braniff, Southern, and Aloha, as well as many non-pilots (76). He and his associates orally reported that their applied techniques of measuring cognition, personality and mental status are so sensitive that they detect incipient effects of disease, alcohol or drug use, and depression (78). The group reports that the technique correlates with flight performance and is predictive.

As previously cited, Eisdorfer reports that the findings of these longitudinal studies do not support the hypothesis that there is a "universal, progressive loss of cognitive functioning with advancing age" (24). Jarvik *et al.* have demonstrated that "if illness does not intervene, cognitive stability is the rule and can be maintained into the ninth decade" (37).

Shock emphasizes that gerontologic literature prior to the 1960s was based on studies of older subjects drawn from hospital, nursing home, or other institutional settings (69). Many of these studies have been summarized by Gerathewohl in his report No. 1 (29); hence the importance of longitudinal, prospective studies that, on intake, contain active persons, functioning individuals living in the community. The data from these studies give a far different picture from that of the classic cross-sectional studies of aging. The longitudinal studies of Shock and his colleagues have shown that there is a great deal of individual variation in health status at various ages and that an individual's age is not a useful predictor of performance. Also, changes introduced by age alone are small, with the marked changes in given individuals resulting from specific diseases.

Since age changes are very gradual, adaptations and compensations are continually made in the healthy active individual. Age is not a primary factor in various declines until well beyond the 70s. Learning and memory in healthy individuals do not change into the 70s. In this regard, Shock warns that we must watch for unscientific statements about the aging process, especially statements based on anecdotes, and that "norms" based on older "sick" persons must be discarded (69).

Kannel states that the Framingham study has shown the greater likelihood of coronary artery disease in persons with untreated hypertension, glucose intolerance, or who smoke and are overweight (39). A risk profile for a primary candidate for coronary artery disease includes a steady rich diet, smoking, little exercise, obesity, high blood pressure, high blood lipids, a marked sense of "time urgency" and a tendency toward diabetes. One in three with this profile will have a cardiovascular event by the age of 60.

Kannel points out that multiple marginal abnormalities, if not tended to, can, by multiplexing, become the equivalent of a major risk factor. These risk profiles developed by the Framingham study powerfully enhance the ability to predict an individual's risk of developing cardiovascular disease. High-risk individuals can be readily identified today.

Bruce reports that, of 2,365 clinically healthy men between 25-69 in the Seattle Heart Watch Program, 47 (or 2%) developed a primary coronary heart disease event (7). The mean follow-up was 5.6 ± 1.4 years. The Seattle Heart Watch has thus generated data that allow screening of a population of apparently healthy persons for the presence of heart disease (6). The data also can forecast for an individual the likelihood of developing a cardiovascular event in the next 6-12 months and also to 5 years. The technique involves a symptom-limited treadmill test of functional aerobic capacity and is applied in an ambulatory setting. Differences in response by different individuals are recorded, as are rates of changes. These become predictors of future cardiovascular events. His group projects that life-long sedentary persons have marked deterioration in the 70s, whereas healthy active persons can extend decades longer.

Bruce has found that exercise tolerance is an excellent risk predictor, as are the onset of certain symptoms, including chest pain and symptom-limited exercise duration. Ischemic ST ECG depression greater than 1 mm or an upslope change greater than 3 mm are also predictive, as are certain impairments of heart rate. The Seattle Heart Watch has found that, if a physician elicits a negative history and finds no clinical or electrocardiographic evidence of heart disease in an asymptomatic healthy man, the probability of developing a primary cardiovascular disease event within the next 5 years is less than 0.017 (7). This compares with 0.014 calculated by Bruce from Framingham data (40). Adverse risk factors include a positive family history for heart disease, smoking, hypertension in excess of 140/90, and cholesterol in excess of 250. The computations of cardiovascular event probability can be made irrespective of age.

Multiple studies on cardiovascular disease risk factors have corroborated the technologic advances that now permit the quantitative estimate of these for a given individual (3,18,32,48,68). That these findings are being applied to the airline pilot group is reflected in the following quote: "Airline pilots are the healthiest group in the world," made in July, 1980, by Dr. G. J. Kidera, retired Vice President for Medical Services, United Airlines (42). His successor, Dr. C. R. Harper, describes the successful reversal of disqualifying cardiovascular signs and symptoms in airline pilots by a program of risk factor reduction (33). He gives case histories of medically grounded airline pilots who, following reduction of certain risk factors and the adoption of healthier life styles, returned to healthy states and were subsequently medically recertified and resumed their airline pilot duties. Harrison and Smith suggest methods of assessing the cardiovascular dynamics of pilots, irrespective of age (34). The Bethesda Cardiovascular Conference supported by the FAA gives specific means for assessing the cardiovascular status of individual pilots, irrespective of age (23). Busby and Davis describe the return to duty of airline and commercial pilots who have atrial fibrillation but have been found to have no other cardiac condition precluding safe flight duties (10).

A report by Orford and Carter in 1976 demonstrates that Northwest Airlines pilots had only a 20% chance of not reaching retirement because of medical reasons (61). In this vein, the Air Transport Association presented a tabulation of permanent pilot medical groundings in United Airlines for 1969-78 to the Subcommittee on Aviation Hearings, U.S. House of Representatives, July 18-19, 1979. Table II shows the data for the years 1977 and 1978. It will be noted that almost half of the

TABLE II. UNITED AIRLINES: PERMANENT MEDICAL DISQUALIFICATIONS OF PILOTS 1969-78

Total No. Medical groundings 224
1977 This = 0.8% of pilots (41 groundings among 5,263 pilots)
1978 This = 0.5% of pilots (27 groundings among 5,470 pilots)

42% of the conditions = not age related
(psychotic disorder, convulsive disorder,
manic/depressive condition, Hodgkin's disease,
cancer of the lung, leukemia, phobic reaction, head
injury, asthma, non-tropical sprue, osteomyelitis,
pituitary adenoma, and other conditions)
24 pilots in 30's
66 pilots in 40's
90-40% = less than 50 years of age

A review of data presented at the July 1979 Subcommittee on Aviation Hearings, U.S. House of Representatives, Washington, DC, contained many conditions not correlated with age. The data do not support an age 60 rule.

conditions are not age-related and that almost half of the persons were less than 50 years of age. The remaining conditions were made up of "arteriosclerotic heart disease," myocardial infarction, diabetes, or other genetically predisposed or life-style-promoted conditions. The groundings were in the 0.5-0.8% range of all United pilots. An upper age limit of 60 years does not serve as an effective means of eliminating these persons from flying. Neither do these conditions justify any upper age limit.

Although some medical disqualifications tend to occur at higher ages, their conditions are often genetically predisposed, life-style-promoted, or both. Certain diseases take time to develop and, accordingly, may be improperly attributed to the aging process.

Effective ambulatory screening methods for neurological and mental status disorders in pilots are referenced in a publication based on a workshop sponsored by the Federal Aviation Administration (22). It is significant to note that the group does not reference age as a factor, but concentrates on individual pilot assessment. This is because these screening methods are used independent of age. Specific techniques for determining central and peripheral nervous system integrity, including cognitive functions, are given by Strub and Black, in *The Mental Status Examination in Neurology* (73). The FAA has issued neurologic guidelines for assessing mental and neurologic functions, including cognitive functions, in recovered alcoholics (25). Some of the pilots checked have been found to have permanent alcohol-induced organic brain damage or other abnormality and have not been recertified. Others have been found to have normal brain function. More than 300 exemptions have been issued to alcoholic airline pilots based on findings made in accordance with the above protocol. This approach of individual assessment can be applied to nonalcoholic pilots of any age.

ACCIDENT DATA

Table III shows the scheduled U.S. Airline accidents due to pilot incapacitation by cardiovascular or other diseases. Note that since 1930, when airline operations became a practical reality, there have been none—a half-century of experience. Table IV shows the two U.S. cardiac incapacitation accidents that occurred on nonscheduled airlines (the 1962 accident was a cargo flight). Note that the incapacitated captain in 1962 was 38 years old (also, the co-pilot was not fully qualified in the aircraft). The 1966 accident was being flown fraudulently by a 59-year-old captain who hid his history of a myocardial infarction and his diabetes requiring insulin from the Federal Aviation Administration (he also owned the airline). Neither of these cases justify on age 60 rule. This rule could not have prevented these accidents.

Fig. 4 shows captain ages in scheduled airline accidents for 1970-77 as contained in National Transportation Safety Board Reports. The peak captain ages for

TABLE III. SCHEDULED U.S. AIRLINE ACCIDENTS DUE TO PILOT CARDIOVASCULAR OR OTHER DISEASE.

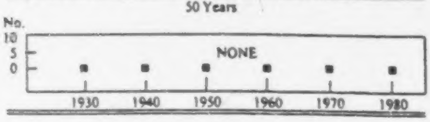
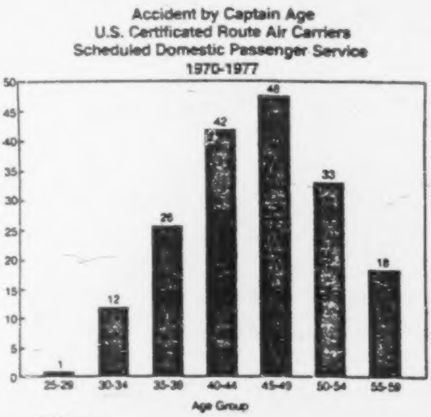


TABLE IV. AIRLINE CRASHES DUE TO CARDIAC INCAPACITATION.

	Captain's Age
Unscheduled Flying Tiger (Piston-4 Engine) North Hollywood, California Date: 14 Dec., 1962	38
Unscheduled American Flyers Ardmore Oklahoma (Electra), Date: 22 Apr., 1966 (The Captain owned the airline; was flying fraudulently as he was receiving treatment following a myocardial infarct and was a diabetic requiring insulin.) CAB Accident Reports	59



NTSB Reports

Fig. 4. Captain age plotted against airline accidents demonstrates a marked fall-off after the 40's. The older pilots are more experienced and less likely to be involved in accidents (NTSB Reports).

these accidents is in the 40s, with a rapid fall-off to age 60. The older captains have the greater experience, ability, and judgment, and have become older captains by not having fatal accidents while younger. These are the safer pilots, and this is why command of the larger, more sophisticated, wide-body, high-density passenger aircraft is universally entrusted to them when they bid on them, as they almost invariably do.

Table V provides an analysis of pilot-in-command accidents by age during 1978 involving those pilots holding Air Transport and Commercial Certificates operating in the general aviation area. Note that the progressive decrease in observed accidents per 1,000 pilots with age further substantiates the accident experience on scheduled airlines. Increasing pilot age and experience is correlated over and over with a decrease in accidents. This has been previously shown by Booze (5), and by Mohler *et al.* (57). Gerathewohl, on page 46 of his report number II, graphs the pilot accident data by age as given by Booze, visually demonstrating the decline in accidents by experienced pilots with increasing age (30).

TABLE V. PILOT AGE AND ACCIDENTS: 1978.

Age	Active Pilots	No. Accidents Observed	% of Accidents By Age	No. Accidents Expected	Observed Accidents Per 1,000 Pilots
16-19	374	8	0.4	3	21.4
20-24	10,839	167	8.2	92	15.4
25-29	26,102	312	15.3	220	12.0
30-34	45,011	414	20.3	379	9.2
35-39	41,742	321	15.8	352	7.7
40-44	35,270	236	11.6	297	6.7
45-49	28,012	214	10.5	236	7.6
50-54	19,660	164	8.0	166	8.3
55-59	22,499	131	6.4	190	5.8
60+	12,205	71	3.5	103	5.8
	241,714	2,038	100.0	2,038	

Source: NTSB and FAA Statistical Handbook, Calendar year 1978. Pilots-in-Command having commercial and Air Transport Certificates, General Aviation

An analysis for the year 1978 demonstrates a progressive age fall in the accident rate of commercial and airline transport pilots flying in the general aviation environment (NTSB and FAA Reports).

In regard to inflight pilot incapacitations causing accidents, Buley reports five examples for 1961-66, as shown in Table VI (8). Note that the average pilot age is 46.2 years and, if the 59-year-old fraudulently flying captain is deleted, the average age falls to 43 years. These data, not significantly changed to this date, do not justify an age 60 rule. Buley also gives information on 12 nonfatal inflight incapacitations; the average age of 44.3 years again does not justify an age 60 rule.

TABLE VI. AIRLINE PILOT INCAPACITATIONS CAUSING ACCIDENTS (INCLUDES UNSCHEDULED AIRLINE FLIGHTS).

Location	Pilot Age
1. Brisbane, Australia 24 May, '61	44 (PIC)
2. N. Hollywood, CA 14 Dec., '62	38 (PIC)
3. Ardmore, Oklahoma 22 Apr., '66	59 (PIC)*
4. Catagena, Colombia 15 Jan., '66	45 (PIC)
5. Oslo, Norway 8 Dec., '66	45 (COP)
*Pilot flying fraudulently	Ave. Age 46.2
Minus fraudulent pilot:	43 Years Ave. Age
(12 nonfatal inflight incapacitations:	44.3 Years Ave. Age)
Buley, Jan. 1969	

Data on accidents caused by airline pilot incapacitations show an average pilot age in the mid-40's. These data do not support an age 60 rule.

Reighard and Mohler documented inflight pilot deaths for 1951-65 and found the average to be close to one per year, with some years subsequently having none and some having two or three (65). The continuing average remains the same. Multiple crew members and FAA-required crew training regarding inflight handling of incapacitations, together with the miniscule numbers of these cardiovascular events, account for the half-century safety record in this respect.

Bennett has reported that the vast majority of inflight incapacitations are not age-related and include, in rank order: gastrointestinal upset, diarrhea, ear problem, "faintness," headache, and vertigo (2). These are also cited by Leighton-White, who stresses that food poisoning, not an age-related emergency, has received little attention from the airlines as a potential hazard, reflecting the general concept that incapacitation of a crew member is a very low-risk problem today (46).

Older healthy captains have the experience, judgment, problem-solving ability, and rapid response capability to avert emergencies of all types. Two examples of this are given in Table VII. In both cases, the captains were commended by high authority for averting catastrophe. United Airlines gave a major cash award to the B-747 captain who, a few weeks later, was forced out prematurely by the age 60 rule. The Department of

TABLE VII. OLDER CAPTAINS.

	Good Judgment Fast Response Time Best Safety Record Captain Age	Date	Location
United 747	59	May 21, '78	Pacific (Honolulu)
	(Engines 1, 2, and 4 failed at 22,000 feet due to ice. Captain got No. 2 going at 300 feet above surface and made safe landing.)		
Continental DC-10	59	March 1, '78	Los Angeles
	(Reacted in 1.2 seconds when tires blew on take-off roll.)		

Older captains have an excellent record of fast action in responding to emergencies as shown here (Subcommittee on Aviation Hearings, U.S. House of Representatives, July 18-19, 1979).

Transportation and the Federal Aviation Administration gave a major award to the DC-10 captain, who was making his last flight before being forced out by the age 60 rule when he encountered the potentially catastrophic take-off event, reacting within 1.2 seconds and averting disaster (60). Many other examples on all airlines could be cited. There is no evidence that healthy competent older pilots are susceptible to degradation in performance capability compared with younger pilots. There is no evidence that older pilots have any greater difficulties transitioning to new aircraft than younger pilots.

The continuing premature loss today of these and hundreds of other experienced airline captains is no longer medically or operationally justified.

SAFE PILOT PERFORMANCE

Safe pilot performance rests upon the following:

A. Freedom from impairing disease (including the longitudinal health record and current health).

B. Capability of performing, including the longitudinal performance record and the assessment performance on flight checks, simulator checks and en route checks. Gerathewohl, in Report No. III, illustrates how pilot performance can be quantified (31).

C. Motivation to continue (as articulated by the individual pilot).

These items are highlighted in Table VIII. Today there are excellent means of quantifying all of the pertinent performance functions and fully assessing the health status of any pilot or, for that matter, any other crew member, irrespective of age. Gen. R. L. Bohannon, on contract with the FAA to evaluate the age 60 question, further describes how low-risk pilots, from the health standpoint, can be identified and allowed to fly with the airlines past age 60 (4). At present, the International Civil Aviation Organization has received a study recommendation that all upper age limits be deleted from its standards (27). A number of the member countries have no Federal upper age limits (for example, Canada and Mexico). In some, such as Great Britain, an age 60 limit applies only to the Captain. McFarland provides certain concepts concerning the means by which older persons can be retained in the work force by individual assessments (49).

TABLE VIII. FACTORS IN DELETING A FIXED MANDATORY RETIREMENT AGE

I. Free of Impairing Disease
    A. Longitudinal Health Record
    B. Present Health Assessment (Including Risk Factors)

II. Capable of Performing
    A. Longitudinal Performance Record
    B. Present Performance Record
        Flight
        Simulator
        Enroute

III. Motivation to Continue

CONCLUSION

As illustrated in this paper, there is today no physiological, psychophysiological, or medical justification for the "age 60" airline pilot rule. Some of the many reasons why this is so follow:

1. U.S. morbidity and mortality data of 20 years ago, when the regulation was established, have markedly changed for the better;
2. Longitudinal age studies, including those on pilots, have exploded outmoded concepts of inevitable declines of capability prior to very advanced ages;
3. Dramatic advances during the past 10 years in disease detection, understanding, and treatment have achieved practical application throughout the U.S. and many other countries;
4. Improvements in predicting the development of disease and the availability of preventive measures provide a powerful tool for health maintenance;
5. Aircraft simulators and flight performance provide detailed information on a specific individual's cognitive and perceptual flight skills and overall performance capabilities, including handling emergencies. Together with a longitudinal record of performance, a total history and record of the individual's capabilities are clearly defined and enable a reasoned decision concerning future performance.

By 1980, the point was well passed for biomedical justification of an age 60 rule. Individual assessment of airline pilots, irrespective of age, is within practical reach now, and actually is being practiced by various airlines today that are not subject to the rule (55). Indeed, elimination of the age 60 rule can only enhance air safety, as companies will be able to continue utilizing the advanced skills and experience of their older healthy pilots.

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PREPARED STATEMENT OF CAPTAIN FREDERICK A. MORSE, TRANS WORLD AIRLINES

My name is Frederick A. Morse and I am employed by Trans World Airlines as a 747 Captain. I am being forced to retire on December 1, 1985, my sixtieth birthday, in accordance Section FAR 121-381 of the Federal Air Regulation unless the Federal Aviation Administrator grants me an exemption or quickly modifies the age 60 rule. I have applied to the Administrator for an exemption in accordance with FAR Part 11, a copy of which is attached. I have also included copies of my blood and stress tests taken this month to support this testimony. These tests are not normally required by FAA, but are provided to indicate that I am physically qualified to fly, and well in excess of FAA standards.

On December 1, 1985, I will have been flying for 40 years. These include 33 years with TWA, 23 with the U.S. Naval Air Reserve and a total of 24000 flying hours. I was also an FAA approved Flight Instructor and Check Airman for approximately 5 years. In addition to flying, I have been a member of the Airline Pilots Association for 33 years, serving as TWA MEC Grievance Chairman, Pilot member of the TWA System Board of Adjustment, local Council Chairman, and Aeromedical Chairman. I believe that this experience make me uniquely qualified to comment on the age 60 rule.

I believe the age 60 rule was made originally by well intentioned officials responsible for public safety. In my opinion, there were four reasons for it; age, health, the transition to jets and economics. Back in 1959 the airline industry was only 35 years old and there weren't many pilots age 60. Military pilots could not fly combat aircraft beyond age 35 nor act as pilot in command past age 50. There was no pilot history for officials to use to determine how long it would be safe for an airline pilot to fly. Today we have that history and experience, including 50 year old astronouts, 65 year old flight engineers and hundreds of pilots flying to age 60. Current statistics indicate a continuing rise in life expectancy, which reflect medical advancements and a greater knowledge of health, diet and exercise. So age 60 which might have been "old" is now "young" and experience of pilots flying to age 60 which was lacking is now available. Therefore, age by itself, is not longer a legitimate reason for forced pilot retirement.

The second reason, health, is also unrealistic. Pilots are the most health conscious, health monitored professionals in the world. Our jobs depend on our good health.

To safeguard the public, airline captains are required to take 2 FAA physicals each year including an annual EKG after age 40, some companies also administer their own more rigorous medical examinations. Our Union, ALPA, has its own medical department which provides the membership with the latest developments and techniques in health maintenance. In spite of these advancements, health problems do arise for pilots just as they do for the general population. However, the system of regular physicals required by the existing regulations insures medical deficiencies are discovered early before there is an adverse impact on safety. Once discovered the FAA has a system of exemptions for certain physical problems. Medical exemptions have been granted by the FAA to pilots with one eye, heart repair, high blood pressure, and a host of other impairments that are rendered safe by a close-monitoring. Age is, however, omitted, but it could and should be included in FAA's list of approved exemptions. I am sure any pilot desiring to fly after this 60th birthday could also be willing to undergo more frequent and rigorous medical examinations.

The third reason for the rule was pilot proficiency, which included the transition in the late 50's from piston aircraft to jets.

Pilots have always had "check rides". Captains have 2 a year and co-pilots and flight engineers have 1. Few professions are subjected to the same degrees of career long checking as professional pilots. To compare early checking equipment and procedures is similar to comparing the first flight by the Wright brothers and todays Shuttle. Simulators today are highly sophisticated and have the capability to perform all the manuevers the aircraft can, including fires, wind shears and electrical, engine, hydraulic and pressurization failures. Simulators are used extensively to recreate and thereby learn from most accidents. Today's flight instructors are also highly experienced and trained, and can easily determine the competence of any pilot, in both knowledge of line equipment and capability to use it. In addition to these checks, everyday line flying is also checking. A captain I knew was found to have Hodgkins disease as a result of a report to management by the pilot flying with him. Finally the transition from pistons to jets has been accomplished, and most airline captains reaching age 60 this year have been flying heavy jet aircraft for 25 years. The means of assuring their continued capability to do so is available, and could be used to protect the public safety.

The fourth reason the age 60 rule was adopted was economics, and in my opinion, it was the only reason, Union-Company agreements are such that the senior pilot flies the equipment of his choice. This meant that a senior pilot would choose jets and the return to a company from the investment in training a senior pilot on jets was insufficient. Also, if a senior pilot was forced to retire, a new pilot could be hired at a much lower salary thus saving money for the company. Also, at the time of the implementation of the rule, it was conceivable that a senior captain would not be capable of flying jets. In which case the training costs expended was a complete loss. Today, however, every one flies jets and the problem is therefore solved before becoming a captain. The other economic consideration was the pilot union which in 1959 was practically all pilots, flight engineers belonged to a separate union. Although no poll was ever taken of its members, ALPA at first fought the rule tooth and nail. Pilots simply did not feel that their age was a factor nor did they want their means of livilihood removed. But in 1966, procedures were changed and flight engineers joined the pilots union, and they entered the progression from flight engineer to co-pilot to captain. Further, qualified existing flight engineers were trained and given the opportunity to become pilots.

This eventually changed ALPA policy from fighting the age 60 rule to favoring it, as it meant that promotion to captain would occur more quickly. It remains that way today.

To summarize, there is no comparison in any area of the industry between today and 1959. The unknowns of 1959 are now known and the precise means of determining the factors necessary for the safety of passengers travelling by air are available and used. The loss of a pilot's age 60 experience is not in the interest of public safety in my opinion. Everything I have learned in a 40 year career tells me that it is time for a rule change. It is an honor to appear before this committee, I feel very humble and proud, and I hope that my testimony will help in some small way to change the rule.

OCTOBER 31, 1985.

Hon. EDWARD R. ROYBAL,
House of Representatives,
Select Committee on Aging,
Washington, DC.

DEAR MR. CHAIRMAN: Thank you for your support to change the FAA Age 60 Rule and your letter of October 22, 1985, in regards to the hearing held on Oct. 17, 1985, by the House Select Committee on Aging. Many good airline pilots are having their employment terminated because of this antiquated rule. The FAA Age 60 Rule serves no useful purpose. The FAA even hires airline pilots over age 60 to work for them and give us check rides. A few years ago, the FAA was allowing some United pilots over age 60 to fly a B-727 for the San Diego baseball team.

My employment was terminated by this rule in August of 1982, as a B-747 copilot by United Airlines. By court order, I was returned to my old career as a flight engineer in February 1983. I enjoy working as a B-747 flight engineer. My health is good. I completed a 3-day proficiency check ride in Denver on October 29th. The check pilot complimented us for doing a good job. I had an FAA physical in June of 1985, and a Company physical in Oct. 1985, both were good. I believe I am doing the best job for United that I have ever done. I believe this is the same story that you would hear from hundreds of airline pilots that are approaching age 60, and if they enjoy their work. I see many good pilots being terminated at age 60.

It is time to terminate this archaic FAA Age 60 Rule. United is very short of crew members and the training center is overloaded. This will be true for many of the other airlines. Now would be a good time to change the rule, and I look forward with great expectations that within thirty days the doctors will have developed an "examination protocol" for those who desire to work after age 60 as a captain or copilot.

I have reviewed the statement of Captain Henry Duffy, President of the Air Line Pilots Association which was submitted for the record. In my opinion, the reason he did not appear at the hearing was that his statements would have been different from what he put in the record. History would tell him that ALPA has in the past negotiated for pilots over age 60 to continue flying for TACA Airlines (Council # 58 in New Orleans, La). He should look at his ALPA Policy Manual for 1967, page 77 (copy enclosed). He knows that it is safe for pilots over age 60 to fly and it appears to me that he did not want to make these statements before the committee, because this would put him in bad standing with the younger pilots. The younger pilots would like to see the older pilots leave so they could have better paying jobs. Safety is not the problem.

Will be looking forward to progress in terminating the Age 60 Rule. Thank you for keeping me posted.

Sincerely,

L.F. MURPHY.

(Retirement Policy)

Fixed Retirement Age for Air Line Pilots

The Association strongly *opposes* any air line, government agency, or person arbitrarily setting a retirement age. A pilot of any age should be permitted to continue to perform the duties of an air line pilot so long as he is able to meet the established standards for a scheduled air line pilot. *(Board 1950.)*

Negotiation of Company Retirement Plans

The Association deems pilot retirement as a proper element of pilot compensation and as such is a valid objective and subject for negotiation and incorporation into collective bargaining agreements between the pilots and respective air line carriers. *(Board 1954).*

Retirement Policy and Principles

The principles embodied in the report of the advisory committee on retirement, which reported to the Board of Directors at its 1954 Convention shall constitute the guide for the President and officers of the Association and for member air lines of the Association in resolving retirement problems for pilots.

Although reasonable and sound deviations from this program may be permitted in specific instances by member air lines and the President of the Association, negotiation of retirement programs to cover air line pilots shall substantially conform to the principles enunciated in this report. *(Board 1954.)*

Pilot Aging and Retirement

Association policy on pilot aging and retirement include consideration of the following provisions:

(1) An air line pilot carrier should provide the pilot with a standard of living over his entire lifetime which is commensurate with the high standing of his profession.

(2) It is desirable to keep the pilot flying as long as he can do so safely and efficiently.

(3) A pilot should be able to retire prior to normal retirement if he so desires, provided however that there should also be a positive financial incentive to keep flying until his normal retirement age.

(4) The Association should continue its past policy *of not recognizing* a compulsory retirement age for pilots which is not supported by valid statistical data.

(5) Because of individual differences between chronological age and physiological or functional age, it must be recognized that any chronological age agreed

upon will be some sort of an average, and pilots at both ends of the scale should be given consideration. *(Board 1956.)*

TRANSAMERICA AIRLINES,
Oakland, CA, August 26, 1985.

Hon. EDWARD R. ROYBAL,
Chairman, Select Committee on Aging
Washington, DC.

DEAR MR. ROYBAL: Transamerica Airlines wishes to support the efforts of those who wish to modify or change the FAA age 60 rule.

It is the feeling of this airlines that, given adequate medical examination, most pilots will be found to be medically qualified to fly in airline operation after age 60. As long as there is no restriction on the use of pilots after age 60 in terms of types of scheduling and the like, Transamerica Airlines heartily endorses the concept and the efforts of those who wish to revise or change the rule, and will be supported by us.

The incidents of medical disqualification of pilots at this airline occurs at an average age of 51. Of the 86 pilots and 6 flight engineers who have retired from Transamerica Airlines in the last five and one-half years, only one has died. Many of the pilots who have retired from our company have continued their flying careers with foreign airlines. These pilots who are forced to retire at age 60 are, in our view, capable of continuing in their positions in almost every instance. Our airline has significant investments in these pilots in terms of training, and they offer the greatest level of experience in our pilot work force. It seems to Transamerica Airlines that an appropriate medical protocol for exemption from the age 60 rule or modification to the age 60 rule, based on advances made in medical science and technology over the last several decades, will show that these pilots are capable of continuing their responsibilities with the airlines of the United States.

Should you or members of your staff wish to talk to me, I will be happy to do so. I will be the spokesman for Transamerica Airlines in regard to this subject.

Sincerely,

H.L. NEFF,
Vice President, Flight.

JENNINGS, OK, *October 11, 1985.*

Hon. MIKE SYNAR,
Select Committee on Aging,
House of Representatives, Washington, DC.

DEAR MIKE: I understand that the Select Committee on Aging has tentatively scheduled a hearing for Thursday, October 17, 1985, at 10:00 a.m., to consider what action, if any, the Congress should take concerning the FAA's so-called "Age 60 Rule for Commercial Airline Pilots." I would like to give you my views on this matter.

I was a pilot with Trans World Airlines for 35 years; and for 33 of those years, I served as a captain. I commenced my airline career (after having been a Navy pilot for 5 years) flying Douglas DC-2s ("Giant Silver Airliner Takes the Skies"—the headline in the Los Angeles Times, for this 14-passenger, 150-miles-per-hour airliner). And, I closed my career flying the Boeing 747—I was the 6th TWA line pilot to fly this plane when it started service in 1970.

On May 20, 1974, I was retired ("fired") simply because I had reached age 60. I believe that all knowledgeable men realize that airline flying is a judgment factor; and should not everyone's judgment continue to improve with experience? I should like to honestly tell you that I believe the best flight that I flew during my first year as captain (1941) was as well flown as the worst flight that I flew the last year BUT I don't believe that it would be a true statement.

I was 71 years old the 22nd of May, 1985 and have just completed a very exhaustive routine health examination (including a stress cardiogram) at one of our Nation's leading medical clinics and the examining doctor started our "debriefing" by saying, "There are lots of 30-year-olds that wish they were in as good condition as you"—blood pressure—115/68; cholesterol—170; vision—20/30 (uncorrected); etc. I asked, "How long do you expect that I will live?" The answer, "Somewhere between 5 minutes and 30 years!" We don't know how long we will live, do we? That is one of the main reasons, starting back in the early '30s, that we had a copilot—to "take over" should "something happen to the captain." And, as you already know, on the planes that I flew at the end of my career, we had 2 extra pilots to "help the captain, if necessary."

Most members of Congress do an extensive amount of flying. I should think they would feel more comfortable in the hands of older pilots, supposing those pilots had passed their physicals and flight checks.

I feel that our Country has unfortunately drifted into a routine of settling some of its most important problems, purely on a basis of existing pressures and that's "sure too bad!" Me? I just want to see done what is best for the Country I love. If I had the chance, I would not choose to return to the cockpit; but I would feel very comfortable with some older guy at the wheel, provided he had passed his checks as mentioned above.

If there are any questions that you, or any other members of your Committee, would like to ask me, then I would be happy to try to answer them. I would even come and testify before your Committee and let you see "how senile I am not!"

Your grateful constitutent,

ARLIE J. NIXON.

P.S. As to the argument—"Make room for the younger guys," we should not think of the airlines, where so many lives are at stake (your life included) as a "welfare agency"—we have many other agencies that provide for the needy!

DALLAS, TX.

Subject: Biographical Information on Harry S. Owen.

AGE SIXTY EXEMPTION PANEL
Chicago, IL.

Born June 30, 1924 at Rotan, TX (Western part of State). Divorced; One adopted Daughter (Donna Owen: In College majored in music. Works in Entertainment field. Partner in own band, Song writer, and performs as Vocalist.)

Had a very early interest in Aviation. Started taking flying lessons in Late 1930s (Parker Flying School, Sweetwater, TX). While still in High School, soloed in 1940 on 16th birthday.

After completing High School in 1941, enrolled at Parker Flying School for complete course in Flying. Worked at R.A.F. Training Centre, Sweetwater, TX, in Line Maintenance while continuing flight training at P.F.S.

Completed flight training at P.F.S. and was accepted at Army Air Corp. Central Instructors School at Kelly Field, TX. completed C.I.S. at Kelly and was certified as Military Flight Instructor. This certification allowed me to instruct in any Army Air Corp. School (the age limit was waived down to 18 yrs of age). This enabled me to be the youngest flight instructor in WWII.

After instructing 8 classes of cadets, was released to join Fifth Ferry Group at Love Field, TX as a civilian Ferry Pilot. Worked as Ferry Pilot, delivering many types of airplanes all over the USA.

Attended the Air Corp. Advanced Multi-Engine Instrument Training School at Randolph Field, TX. After completing this school as a civilian I accepted an Appointment as an Army Air Corp Officer and was given wings as a military Pilot.

Was then sent to 7th Ferry Group at Great Falls, Montana and Ferried airplanes to the Russians through Canada and Alaska.

In 1944 went to and completed the Advanced C-47 Instrument School (Hump Pilot School).

I then took delivery on a new C-47 at a factory in Oklahoma City and flew it to Myitkyina, Burma and formed the 1348th AAFBU.

Flew 137 round trips across the Hump to China—then back to Dum Dum and flew Captain on a military Airline (Harry Howtons Airline) for the China, Burma, India Theater.

Then I was attached to the OSS and operated in Bankok, Saigon, Singapore, Batavia, and Java.

Went back to the USA and MATS Pacific Division until 1948. Then I went to work for Commercial Airlines in Early 1948. In late 1948 was recalled to the Air Force to fly the Berlin Airlift. Went to C-54 Recurrent Training at Great Falls, Montana. Then to Celle, Germany for full tour on the Berlin Airlift. In 1949 was released back to commercial airlines.

In 1950 was recalled to the Air Force to fly Korean Airlift. Flew Air Evact. out of Kelly Field. Then to Japan as 315th Air Division Flying Safety Officer. From that job was selected to fly the United Nations Supreme Commander. Served Generals Matt Ridgeway and Mark Clark in that position. Completed Korean tour and went back to the Airlines.

Flew for Delta Airlines until FAA forced retirement on July 1, 1984.

Flew Captain on (DC-3-4-6-7-9) Curtis C-46, Convair 440, Lockheed Constellation, Boeing 727, Lockheed L-1011, and L1011—500 international Aircraft.

Flew out of Dallas, TX for most of career.

For 6 months flew Atlanta—London and Atlanta—Frankfurt run.

Trained and operated all of the latest navigation computers. FMS—Flight Management System, INS—Omega and Loran Co. Navigation Systems.

Certified to fly lowest minimums available to any airlines. CAT III B.—0 ceiling and 300 Ft. Visibility. This is a complete computer approach and landing. Pilot only takes airplane after complete stop on runway.

Last trip on airlines was Frankfurt to Dallas, TX, June 1984.

Military Aircraft Flown: 6,080.00 hours. L-4-5; PT-17, 19, 22; BT-13, 15; AT-6, 7, 9, 11, 17; T-28; P-39, 40, 63; A-24, 25; Lockheed Hudson and Constellation; C-46, 47, 54. B-17, 18, 25, 29.

Civil—other than airline: Curtis Pusher, OX Robin, Linc. Page, COB F-2, 3, 4, Aeronicas, Porterfields, Swift, Luscombe, Mooney, Stinson, Navion, Ercoupe, Waco Cabin Biplane, Culver, Howard, Stag. Wing Beech, Ford Tri-Motor, Fairchild, Beech Baron, Cessna-170, 172, 180, 182, 210, 310, Piper Seneca, Jetstar, Lear Jet 23.

Ratings: (1) Airline Transport Pilot; (2) Flight Engineer Rating; (3) Flight Instructor; (4) Commercial-Single and Multi Engine Land.

Military Flying Time, 6,080.00 hours; Civil Flying Time, 26,820.00; Total, 32,900.00.

Awards: 5 Battle Stars, Berlin Lift Medal, 5 Air Medals, China Freedom Medal, DFC.

Physical Activities: Ride Bike, Walk, Power Walk (Race walk with weights), Play Racquet Ball, Lift Weights 2 to 3 times per week, Ride Motorcycle.

I believe what makes me well suited (or any other Pilot) to continue as an Airline Pilot after age 60 are the following:

(1) Mental and physical discipline and a positive attitude are the most important.

(2) Keep current FAA First Class Medical.

(3) Maintain and listen to your body.

(4) Keep up with the advances in medicine and have a doctor that does the same. Stop what you know is bad and start what you know is good for you.

(5) Keep your mind and body very active.

(6) Fly Airplanes. I also fly radio-controlled models. It's fun, good for your eyes and reflexes, and you have to think faster than with a real airplane.

(7) Look forward to your next flight as Captain on your airline, but be realistic, and only look forward to being a passenger on a space flight before you fade away.

Capt. Harry Owen.

Pilots Rights Association,
Washington, DC, October 14, 1985.

Hon. Edward R. Roybal,
Chairman, The House Select Committee on Aging, Washington, DC.

Dear Mr. Chairman: Pilots Rights Association appreciates the privilege of submitting the following comments for the record of the Hearing being held on Thursday, October 17, 1985 into Age Discrimination and the FAA's Age 60 Rule. We commend you and the Committee for investigating this heinous rule, and in your attempts to eliminate age discrimination in employment wherever it occurs in America.

In 1959, the Federal Aviation Administration (FAA) promulgated the Age 60 Rule for commercial airline pilots on questionable evidence. The research projects reviewed by the FAA are flawed in that they were either not applicable to airline pilots in 1959 or are outdated by today's standards.

Even the 1980-'81 study conducted by the National Institutes of Health (NIH) at the request of Congress has been outdated by research that has continued since that time.

The safety record of the commercial airlines is one to be envied by all industries. It is, however, not attributable to any single factor, but to a complex system of many factors and to the continued efforts to improve. For anyone to suggest things should remain "status-quo" is to say we should ignore ways to provide even safer air transportation to the traveling public.

Had the airline industry adopted such a position fifty-years age, we would still be flying DC-3 aircraft at 150 miles per hour. We would not be able to span continents and circle the globe in a matter of hours, and much of the growth in the airline industry and other industries could not have taken place. Business could not conduct itself as it does, and certainly, we could not have rapid transportation for lifesaving and business necessities we have today. One wonders what our defense system and the condition of medical science would be like if the nation had adopted a "status-quo" position in those areas fifty years ago. Certainly, we would be a bilingual nation, but the languages we speak would be German and Japanese if we had taken that attitude.

"Status-quo" is unacceptable in an industry which depends on progress and modernization. It is not acceptable when newer and better technology gives us the means of making the end product even safer.

By present practices, the FAA does not deny a pilot the right to exercise the privileges of his/her airline transport pilot (ATP) certificate. They simply deny the pilot the right to use that certificate in scheduled airline—Part 121—operations. The FAA's Medical Department will grant a First-Class medical certificate to a pilot if he/she passes all the requirements for that certificate. By the same token, the FAA's Flight Standards Department will allow the pilot to exercise the privileges of the ATP certificate if he/she has demonstrated the ability to fly the aircraft in which the pilot is certified. In other words, there is no age limit requirement for medical or proficiency and competence. The catch is that a pilot may fly a B-747, a DC-10, a L-1011, a B-767, a B-727 or any other aircraft, being used by the scheduled airlines, within the United States or anywhere else in the entire world, but he/she cannot do so in U.S. scheduled airline operations.

If, as the FAA contends, there is no test that can be used to determine which pilots over age 60 could continue flying, then the examination it uses to evaluate pilots under age 60 is also not adequate to determine which of those pilots should be allowed to continue flying without jeopardizing safety.

If there is no such test, then a large segment of the medical community has been fooling a lot of people for many years. The United States Navy has had an on-going study of pilots since 1940. In that study, the Navy evaluates pilots on a continuing basis. The Framingham Study has been evaluating individuals for over three decades and is now beginning to test off-springs of the original subjects. The National Institute on Aging (NIA) has sponsored the Baltimore Longitudinal Study for over twenty-five years. They continue to evaluate individuals with a high degree of accuracy. The Department of Health and Human Services (HHS) is sponsoring a six year national study called "Multiple Risk Factor Intervention Trial" which is costing over $12,000,000 annually. The United States Air Force continues research into coronary heart disease (CHD). Colonel Rufus M. DeHart, head of this research says, "There are a number of tests available to detect CHD in asymptomatic patients."

Hundreds of millions of dollars, even billions of dollars are spent annually on every conceivable research project which requires the evaluation and monitoring of individuals. Thousands of these programs show conclusively that we can and do successfully test the individual.

Admittedly, no evaluation system can offer a one hundred percent guarantee. Nothing in life has a one hundred percent guarantee except that death is life's end result. Therefore, we must all accept some element of risk in every regime of life. What is logical is to reduce the level of risk as much as possible and make further improvements as they develop.

In the case of aircraft certification, the FAA has recently authorized the use of two engine aircraft for non stop flights across the North Atlantic as long as those aircraft are operated within 120 minutes of a suitable landing field at all times. With the uncertainty of weather conditions over a long period of all time—particularly across the North Atlantic—prudent flying requires alternate airports outside any weather system. In this case, the planned alternate for operations with a failed engine, which might have been open or available at the time of take-off, could be closed or unavailable, because of rapidly changing weather conditions when the emergency actually arises. This, the FAA believes, is perfectly safe.

In the case of medical recertification of pilots, the FAA has accepted the ability of medical science to reliably test pilots who just a decade ago would have been considered absolutely uncertifiable, because they had suffered such conditions as myocardial infarction, coronary artery by-pass surgery, strokes, alcoholism, drug dependence, psychoses and a myriad of other cardiovascular and psychological conditions. Today, however, the FAA has recertified hundreds of such pilots even though there is a substantial failure rate among those recertified pilots.

According to the President of the Airlines Medical Director's Association, "We could be faced with an international B-747 with as many as sixteen bypasses in the same cockpit, or we could have an intercontinentoal 1011 or DC-10 with four post stroke cockpit crewmembers." He also said, "Imagine the captain just mentioned flying with a first officer who has either a cataract or has lost his right eye. The flight engineer panel normally blocks the third seat view on the rigtht. Thus, we can have a 747 with no one in the cockpit able to see out the right side of the airplane."

Some further thoughts worthy of consideration are in the area of the FAA's medical examination presently given to airline pilots. The FAA does not require a risk factor assessment. According to the NIA and the Aerospace Medical Service Center at Brooks Air Force Base, risk factors are important as highly predictive of the possibility of developing CHD.

According to these sources, hypertension (high blood pressure), elevated serum cholesterol and cigarette smoking are particularly dangerous risk factors. One of the three in an individual doubles the risk of CHD, whereas the presence of all three in an individual increases the risk tenfold. The FAA allows pilots over age 50 to have blood pressure of 160 mm/hg systolic over 98 mm/hg diastolic. The American Heart Association considers normal blood pressure to be 120 mm/hg systolic. Gordon and Devine consider blood pressure of 140 mm/hg systolic as borderline hypertension and 160 mm/hg systolic as definite hypertension.

The FAA does not test a pilot for serum cholesterol and does nothing if a pilot smokes, whereas the most frequently cited statistics support a 70% increase in death rate and a threefold to a fivefold increase in the risk of CHD in men who smoke one pack of cigarettes per day.

Mortality from CHD is 4.5 times higher in diabetic men 15-44 and 6.4 times higher in diabetic women than it is in nondiabetics. The FAA does not disqualify a pilot if his/her diabetes is controllable by diet and exercise.

Genetic factors are also important. A higher incidence of CHD is present in individuals with A, B or AB blood type, and a positive family history of CHD is a significant risk factor, and yet the FAA does not consider either of these conditions.

The sensitivity of the Double Master's Exercise Test (Master's Two-Step) is considerably greater than a resting electrocardiogram (ECG), and a treadmill exericse stress test is twice as sensitive as the Master's Two-Step. The FAA only requires the resting ECG for pilots over age 40, even though the test is considered relatively insensitive for detecting latent CHD in asymptomatic persons.

With all this in mind, and the airline industry facing a serious shortage of qualified replacement pilots. It is time to abolish the Age 60 Rule for the vestige of age discrimination in employment it really is.

Pilots Rights Association again thanks the Chairman and the entire Committee for coming to grips with this matter. We are available to assist the Committee members in any way possible. Thank you.

MIAMI, FL, *October 10, 1985.*

Rep. EDWARD R. ROYBAL,
House of Representatives,
Select Committee on Aging, Washington, DC.

Attn: Mr. Jack Young.

SIRS, I am presently employed by Eastern Airlines as a First Officer on the L-1011. My age is 43. I was a member of the EAL ALPA Age Sixty Committee in 1979.

I would like to go on record as opposing the age sixty rule. I think it is unfair, has no medical validity and is outright discrimination.

I would like to point out to this Committee that there are already pilots flying past the age of sixty and carrying people for hire under FAR Part 135. They have been doing this for years to the detriment of no one. They are doing this with no increase in vigilence either medically, mentally or physically in the form of additional checks. I would like to cite the case of a good friend of mine, Lew Carlisle, who flew the Los Angeles Dodgers baseball team until he was 69 years of age, when he was unfortunately killed in a bus accident. I have no doubt he would still be flying the team if it wasn't for his unfortunate death. The ownership of the Los Angeles Dodgers, entrusting their team, worth millions, to a man of Lew's age, speaks well for the abolishment of the age sixty rule.

I would like to address several arguments used in the past against a change in the age sixty rule. People seem to be concerned about how the change will come especially concerning retirement benefits. I think the change should be slow and orderly, perhaps a year at a time. Retirement could be handled the way it is presently being handled by Eastern Airlines for those retired Captains who are returning as Flight Engineers. That way those who wish to go at sixty can do so without being penalized.

I am sorry I cannot attend the hearings in person at this time. I need a little more lead time. If I can be of any help in the future, please call on me. My phone number is 305 667 0601.

Sincerely,

JOHN F. PURGAR.

THE PENNSYLVANIA STATE UNIVERSITY
COLLEGE OF HUMAN DEVELOPMENT, OCTOBER 7, 1985.

Congressman EDWARD R. ROYBAL,
Chairman, Select Committee on Aging,
House of Representatives, Washington, DC.

DEAR MR. ROYBAL: Thank you for your letter of September 30, 1985 inviting me to prepare a statement for the record for your hearing into the Federal Aviation Administration (FAA) Age 60 Rule for commercial airline pilots scheduled for October 17, 1985. As you requested, I will address my comments specifically to the issues regarding the feasibility of allowing commercial airline pilots to continue their flight responsibilities past age 60 under an appropriate testing program.

Let me call your attention first of all to the fact that the contention by the FAA that they are not aware of any tests that can be given to an individual to determine whether they can continue to fly after age 60, if taken seriously, would cast serious doubts upon the validity of the FAA's current flight certification procedures. The study by the National Academy of Medicine that was reviewed with additional hearings by the NIH special committee on Commercial Airline Pilot Retirement clearly indicated that age 60 had no special significance as a guidepost for age-related changes that might be predictive of pilot competence. Consequently, if the present procedures are indeed judged to be satisfactory to protect air safety, then they ought to be equally appropriate for determining which pilots might be qualified to continue their responsibilities.

The FAA is absolutely correct, however, in stating that we do not now have any data to inform us whether these procedures are equally valid for pilots over age 60. In fact, we will never have such data as long as the FAA systemically refuses to develop or sponsor the development of procedures that will allow a limited trial to offer waivers of the Age 60 Rule to carefully selected commercial airline pilots who wish to extent their work life beyond age 60. The development of such procedures is eminently feasible, and a broad design for a safe approach was offered by the NIH special committee that would have involved monitoring selected pilots' physical and cognitive functions from age 57 or 58, and then granting waivers on a one-year or six-months basis for those individuals whose functions had remained stable.

As far as I know, there have not been any commercial aviation accidents that have been attributed to the simultaneous physical incapacitation of two members of the cockpit crew. Indeed, the probability of stroke or heart attacks occurring simultaneously to two persons would be extremely low even at quite advanced ages. Current medical assessment procedures used for pilots below age 60 are likely to be quite adequate in screening out individuals at above average risk on an individual basis at older ages as well. The real issue with respect to air safety then seems to be the risks due to pilot error. In this regard, there seems to be a suspicion that age-related changes in cognitive function and sensory capabilities may impair the competence of older pilots.

Cognitive ability dimensions, high levels of performance on which appear to be particularly relevant to the avoidance of pilot error, would seem to include the abilities of Inductive Reasoning, Spatial Orientation, and Perceptual Speed. In addition measures of intellectual flexibility might also be useful, as would be more detailed evaluations of the auditory and visual systems (with respect to dimensions such as hearing loss within the range of audible speech, peripheral vision, and speed of visual accommodation) than are currently provided in the standard FAA physical examination.

While we obviously do not have data on the cognitive functioning of commercial airline pilots over age 60, we do have substantial data bases on highly reliable measures of cognitive performance for general population samples. Studies that I have conducted on such samples show that although there are significant average decrements in performance past age 60, such decrements do not affect all or most persons. Over the age range from 60 to 67, for example, decrement was found in less than one third of the persons followed over a seven-year period. It has also been found that decremental changes occur with particularly low incidence in individuals who are in good physical health, have high incomes, have flexible life styles, and lead stimulating lives; all of which characteristics are quite descriptive of most senior commercial airline pilots. Unless an individual suffers serious physical incapacitation, or is prevented from practicing the mental skills measured by these tests, possible age-related changes occur at an extremely slow pace. Some well-functioning older individuals, although they show some decline, may remain well above the average level of younger persons, because they started out at performance levels that may have been well above the minimum level required for adequate job performance. The ability tests used in our studies have been evaluated over several decades. They are highly reliable both on a group and individual basis (see references given below).

In view of the fact that normal aging changes in cognition and sensory function are quite small and proceed at a very slow pace in most healthy individuals during the seventh decade it would seem to be quite feasible to detect abrupt changes that might signal serious declines via annual examinations. Such examinations could be required in addition to the current assessment procedures mandated by FAA for all pilots. It would, of course, be useful to collect cognitive ability data for active commercial airline pilots to determine averages and ranges to establish nornative data that could be used as performance minima. Such a strategy might permit us to determine whether selected older pilots have remaining reserve capacity even though they have experienced some age-related decline from an earlier level of functioning.

A more immediately implementable and useful strategy, that would in my judgment be even safer, would directly address the question whether an individual pilot has shown significant drop in his cognitive functions that might impose a risk of the possible dimunition of that pilot's continuing competence. This strategy would involve determining a base line level over at least three assessment points, say at ages 58, 59, and 60. A waiver for one year could then be safely given to those pilots who have remained stable over the past three assessment points. The waiver could then be extended further on an annual basis for those pilots whose functional levels continue to remain stable at successive assessment points. Implementing such a program would permit us to collect safely the very data, the absence of which now seem to stand in the way of providing adequate procedures for grantng exemptions to those commercial airline pilots who maintain high levels of competence and standards of performance as they reach age 60.

I very much appreciated the opportunity to comment on these issues and hope that your hearings will be helpful in breaking the impasse over changing the Age 60 Rule and will lead to efforts by the FAA to implement a safe and thoughtful waiver program that will make it possible to extend the work life of competent senior pilots.

Sincerely yours,

K. Warner Schaie,
Professor of Human Development and Psychology.

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Eastern Airlines Inc.,
Miami, FL, August 27, 1985.

Hon. Donald Engen,
Administrator, Federal Aviation Administration,
Washington, DC.

Dear Admiral Engen: I have long believed that the FAA's Age 60 Rule should not apply to pilots who are healthy and capable of continuing airline service. My experience over the years reinforces my belief that it is a waste of human resources and a loss to the airline industry to subject our most experienced pilots to an arbitrary age cutoff.

I appreciate your responsibilities in this area and I realize that you have inherited a longstanding FAA policy, but the Age 60 Rule is the king of regulation that has lost its validity, if in fact, it ever was valid. Considering the advances in medicine and technology we have seen since the rule went into efffect, in my view, the rule should be abolished. As a starting point, qualified pilots should be given exemptions from the rule.

A prime candidate for an exemption is William Formato. Bill is an L-1011 Captain with Eastern who has served the company for almost 30 years. I have known him professionally for many years, and he is one of the best. Bill will turn age sixty in October of this year, and I understand he is taking steps to petition so that he can continue in Eastern's service.

Kindest personal regards,

Sincerely,

R.J. SHIPNER,
Vice President,
Flight Operations and System Chief Pilot.

TORONTO, ONTARIO, *November 14, 1985.*

Hon. EDWARD R. ROYBAL,
House Select Committee on Aging,
Washington, DC.

DEAR SENATOR ROYBAL: The enclosed information may be of some help in your continuing efforts to end age discrimination against airline pilots. It is a copy of the results of an extensive medical examination I underwent at the Mayo Clinic in Rochester, Minnesota, in July 1981 which Jack Young has requested I send to you.

Dr. Early Carter, of the Mayo Clinic, arranged the tests, the results of which helped me to get an injunction in the Ontario Supreme Court. This injunction allowed me to continue flying as a pilot for five additional months after my 60th birthday, the compulsory retirement age used by Air Canada, my employer for 37 years.

Subsequently, the pilots' union in concert with Air Canada was successful in overturning the injunction in a higher court; as a result, my employment with Air Canada ended on January 19, 1982. You will note in the Mayo Clinic Medical Report that Dr. E. Carter states: ". . . Accordingly, no evidence for underlying abnormality which would be disqualifying for pilot duties was disclosed . . .".

There is no law in Canada requiring airline pilots to retire at age 60. Indeed, many smaller airlines employ pilots well into their 60's. Nationair, for example, has five captains who are over age 65 currently flying DC8's on international routes. As well, Nordair and Transair have also employed captains over age 60 in the past. Air Canada and the larger airlines, who belong to the Air Transportation Association of Canada, have a policy of age discrimination forcing their pilots to retire at age 60.

May I wish you the very best in your endeavours to end age discrimination against senior employees with bona fide job qualifications requiring demonstrable medical and physical proficiency.

Yours truly,

R. R. STEVENSON.

Enclosure.

MAYO CLINIC,
Rochester, MN, July 15, 1981.

TO WHOM IT MAY CONCERN:

The following constitutes a summary of the comprehensive medical evaluation initiated on Mr. Roderick Ross Stevenson on July 13, 1981.

Clinical interview failed to reveal any evidence for significant complaints. To be sure, he had a tendency for a modest seasonal allergic rhinitis manifest in the spring and the fall. His symptons had diminished over the years and he has utilized no treatment for over ten years nor has he had to lose any time from work. No history for asthmatic features, urticaria, or other systemic allergic disorders.

This pilot remains active physically, has never indulged in alcoholic beverages or tobacco and has avoided obesity.

On physical examination he was 70 inches tall, weighed 161 pounds, had a temperature of 98, plus of 58 (full and regular), and blood pressure 100/64 left and 104/60 right. General physical examination was entirely satisfactory in particular there being no abnormalities with respect to the cardiovascular, pulmonary, musculoskeletal, or central nervous system.

Examination by the Department of Ophthalmology revealed 20/20 vision bilaterally for distant function with a fully corrected presbyopia. Intraocular tensions were normal, extra ocular muscle action was normal, and color vision was entirely satisfactory.

An audiogram revealed satisfactory hearing acuity throughout the entire frequency tested bilaterally.

The following laboratory studies were obtained and found to be within normal limits: electrocardiogram, chest x-ray, routine urinalysis including miscroscopic examination, leukocyte count, erythrocyte count, hemoglobin, red blood cells indicate total platelet count, cholesterol (183), triglycerides (66), and also the following blood chemistries were within normal limits: sodium, potassium, calcium, phosphorus, proteins, glucose, alkaline phosphatase, SGOT, quantitative bilirubin, uric acid and creatinine. A lung function screening test revealed a normal vital capacity and a maximum midexpiratory flow with normal limits.

His blood type was O Rh+.

On July 14, 1981, an exercise electrocardiogram utilizing the Bruce protocol was accomplished. This revealed no evidence for ischemic heart disorder, dysrhythmia, or other heart abnormalities.

A copy of the psychometric studies is attached. It will be noted that there is no indication of disturbance in emotional characteristics, disturbance in intellect, and so forth.

Accordingly, no evidence for underlying abnormality which would be disqualifying for pilot duties was disclosed.

EARL T. CARTER, M.D., Ph.D.

Enclosure.

PSYCHOLOGY—MAYO CLINIC—ROCHESTER, MN

Name: Roderick Stevenson, Age: 59 years.

Tests administered: Wechsler Adult Intelligence Scale, Wechsler Memory Scale; 16 PF, MMPI.

Tests results: Mr. Stevenson was pleasant and cooperative during the examination and interview. He talked freely about his history with Air Canada airlines and his concern over continuing to fly after age 60. He has completed a high school education and has some college training.

The Wechsler examination yields a Verbal Comprehension IQ Equivalent of 111. The Performance IQ is 125. Obviously the latter score indicates a superior perceptual motor functioning. There are no areas of deficiency. Mr. Stevenson works rapidly and efficiently and his eye-hand coordination is excellent.

Selected subtests of the Wechsler Memory Scale indicate memory functioning commensurate with his general intelligence. I feel he is very adequate in both recent and delayed memory.

Neither the Minnesota Multiphasic Personality Inventory nor the 16 PF test show any evidence of significant psychopathology. Mr. Stevenson sees himself as emotionally stable and has greater than average confidence in himself. There is no evidence of depression. There is no evidence of hypochondriacal concern. He conforms reasonably well to social codes and customs of society.

I feel there is nothing in this examination to contraindicate his ability to continue flying.

[Western Union Mailgram]

RICHMOND, MO, *October 16, 1985.*

Hon. EDWARD ROYBAL,
Washington, DC.

Flying schedule prevents attendance at your hearing October 17. Believe present age 60 rule is primitive and arbitrary. Should be replaced by state of art flexible means of safeguarding public safety.

Capt. JOHN TESTRAKE,
TWA.

PREPARED STATEMENT OF CLARENCE THOMAS, CHAIRMAN OF THE EQUAL EMPLOYMENT OPPORTUNITY COMMISSION

I am Clarence Thomas, Chairman of the U.S. Equal Employment Opportunity Commission (EEOC). The Commission is responsible for enforcing, among other laws, the Age Discrimination in Employment Act (ADEA) of 1967, as amended, a Federal statute which prohibits employment discrimination against persons 40–70 years of age.

The Subcommittee has requested the EEOC's position regarding the continued need of the Federal Aviation Administration's age 60 rule for commercial airline pilots. The Commission, as a body, has not addressed the issue of whether the Federal aviation rule is necessary; and therefore, EEOC has not issued a decision on this issue.

However, the Commission is quite concerned about the issue of arbitrarily establishing maximum age limitations upon certain jobs.

Under the ADEA, employers are prohibited from placing maximum limitations on their employees unless the employer can establish that the age limitation is a bona fide occupational qualification (BFOQ) reasonably necessary to the normal operation of the business. The law provides a test in which the rights of older workers are balanced against the needs of the employer and the public interest. In the context of jobs which affect the safety of other persons, an age limitation can be established as a BFOQ if the employer can show the following elements:

1. That the age limitation is reasonably necessary to the essence of the business, and
2. That there is a factual basis to believe that all or substantially all employees over a certain age would be unable to safely and efficiently perform the duties of the job involved.

However, even when the employer cannot carry this burden, if it demonstrates "that it is impossible or highly impractical to deal with . . . [persons over a particular age] on an individualized basis, it may apply a reasonable general rule. . . ." One method by which the employer can carry this burden is to establish that some members of the discriminated-against class possess a trait precluding safe and efficient performance that cannot be ascertained on an individual basis through testing.

The EEOC has several lawsuits pending in the United States District courts that involve private companies which have unilaterally adopted an age sixty rule for its company pilots. We are in litigation because the Commission maintains that age sixty is not a blanket BFOQ for pilots who are not subject to the FAA age sixty rules.

In the context of ADEA enforcement, to successfully assert age 60 as a BFOQ for pilots, the airline would have to show (1) that the proposed age limit had a direct effect on public safety; and (2) that disqualifying considerations applied to all, or substantially all, pilots over 60 who possess a disqualifying trait that cannot be ascertained on an individual basis.

The Commission's position on a proper "bona fide occupational qualification" for the establishment of an arbitrary age rule was adopted by the United States Supreme Court in the case of *Western Air Line* v. *Criswell,——U.S.——*(1985).

The EEOC has conducted no independent study of its own relative to the FAA age sixty rule, but does note that the National Academy of Science report, submitted to the panel on the experienced pilots study, is probably the most authoritative study that has been made in this field.

In closing, we believe that the question to be resolved is whether the age 60 limitation on the employment of commercial pilots is discriminatory and needlessly arbitrary. From our perspective, it appears that choosing age 60, as a limitation, is unwarranted because there is no factual basis to believe that all, or substantially all, pilots over that age are unfit to perform their duties.

The Commission has consistently taken the position, since, the enforcement of the Age Discrimination in Employment Act was transferred to the commission, that arbitary age limitations are contrary to the ADEA.

THE JOHNS HOPKINS HOSPITAL,
CLAYTON HEART CENTER,
Baltimore, MD, September 18, 1985.

Hon. EDWARD R. ROYBAL,
Chairman, Select Committee on Aging,
House of Representatives, Washington, DC.

DEAR CONGRESSMAN ROYBAL, This letter is in response to your request of September 13, 1985 that I prepare a statement concerning the issues involving the ability of a pilot to continue flight responsibilities after the age of 60 years under an appropriate testing program.

My comments with regard to the issue at hand come from my knowledge of the heart and the cardiovascular system in relationship both disease and normal aging. I am Director of the Cardiology Division at the Johns Hopkins Medical Institutions. I have responsibility for the direction of a Specialized Center of Research in Ischemic Heart Disease sponsored by the National Heart, Lung and Blood Institute at Johns Hopkins. I also direct a contract for the study of normal volunteers within the Baltimore Longitudinal Study population of the National Institutes on Aging.

Within the Ischemic Heart Disease Specialized Center of Research program we have developed non-invasive radionuclide methods for detecting the presence of significant coronary artery obstructing lesions which are known to be the cause of heart attacks and sudden death in the vast majority of circumstances in persons over age 60 in this country. We have applied these techniques for the non-invasive detection of ischemic heart disease to the large study of normal volunteers from the National Institutes on Aging. We have taken those individuals from this population who show no evidence of ischemic heart disease or coronary artery disease and studied their heart function in detail. We have examined the capacity of their heart to increase its output when confronted with maximal exercise stress performed on a bicycle. The results of these studies were published recently in the journal circulation 69:203-213, 1984, "Exercise cardiac output is maintained with advancing age in healthy human subjects: Cardiac dilatation and increased stroke volume compensate for a diminished heart rate" by Rodeheffer RJ, Gerstenblith G, Becker LC, Fleg Jl, Weisfeldt Ml, Lakatta EG.

On the basis of this experience and my knowledge of the current cardiological literature I would offer the following recommendations:

Pilots wishing to continue professional activity over the age of 60 should have a medical history and physical examination by a qualified cardiologist. These pilots should subject themselves to thallium myocardial perfusion scanning during maximal exercise with redistribution. This test would be viewed as being passed satisfactorily if normal levels of exercise for the patient's age were achieved and the myocardial thallium perfusion scan was normal.

Also these pilots should have 48 hours of continuous electrocardiographic monitoring by the Holter technique. To continue pilot activities such Holter tapes must show no evidence of cardiac arrhythmias with the exception of occasional atrial and occasional single ventricular premature contractions.

These recommendations are based upon the published information that myocardial thallium perfusion scans performed as exercise car., with remarkable accuracy, eliminate the possibility of significant coronary artery obstructing lesions. Serious other forms of heart disease would be eliminated by performance of an adequate physical examination and by the performance of 48 hours of continuous electrocardiographic monitoring for the presence of arrhythmias. A normal exercise thallium scan and a normal Holter monitor for 48 hours would, in my opinion, reduce to a negligible level the likelihood that a pilot over age 60 would have significant cardiac events which might jeopardize safety on an aircraft.

Certainly it would be my strong opinion that the likelihood of a cardiovascular event on the part of a pilot over age 60 with a normal thallium scan and a normal Holter would be far, far less than is currently the case for pilots between the age 50 and 60 who are not currently routinely subjected to any form of stress testing or detailed cardiovascular evaluation on a routine basis.

In terms of heart function over age 60, we have performed (and reported as noted above) studies of the cardiovascular response to exercise in normal American males over the age of 60 compared to males under the age 60. These studies show no significant age associated decline in ability to augment cardiac output during exercise. Older individuals respond to exercise from the cardiovascular point of view somewhat differently than younger individuals. Older individuals have a smaller increase in heart rate with exercise and rely more on an increase in heart size during exercise rather than an increase in nervous stimulation to the heart. Although there are these differences in mechanisms used to augment cardiac function, the mechanisms available to the older individual are entirely satisfactory in allowing the pumping action of the heart to increase fully during exercise stress. Thus, in summary if the presence of ischemic heart disease and other forms of heart disease are eliminated by the thallium scan an individual over 60 would have sufficient cardiac reserve to allow continued performance as a pilot.

My own area of knowledge does not extend to other systems of the body with regard to this issue but I believe I am secure in providing your Committee with these opinions with regard to the cardiovascular system specifically.

If I can provide any further information to you in this area of great importance I would be only too happy to do so. I hope that these comments are helpful to you and your Committee in their deliberation.

Sincerely,

MYRON L. WEISFELDT, M.D.,
Robert L. Levy Professor of Cardiology,
Professor of Medicine, Director, Cardiology Division.